THE PAPER INDUSTRY and PAPER WORLD

VOLUME 22
NUMBER 6
SEPTEMBER, 1940

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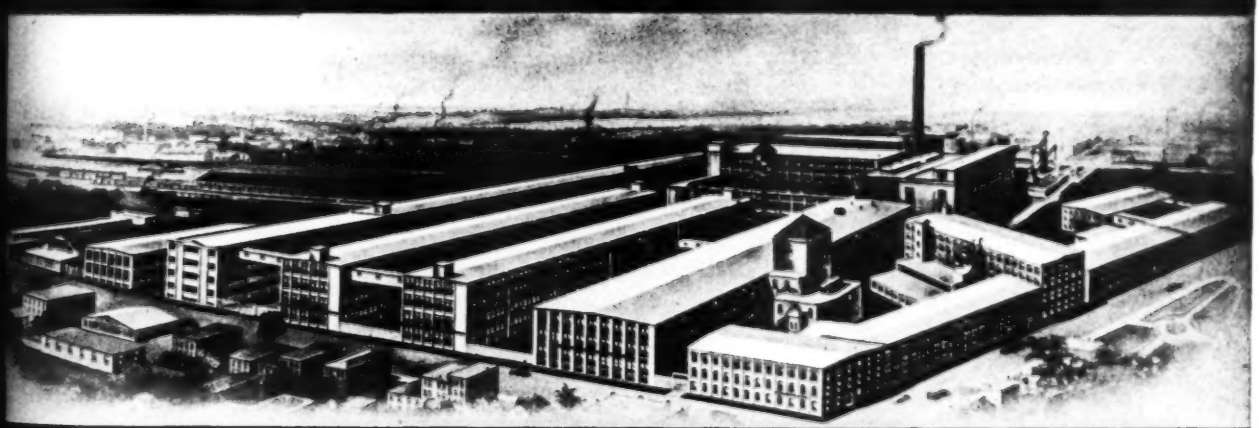
COMPETITION
BOSTON WOVEN HOSE

Price has no Pride!

The buyer whose only index of value is price must realize that he can expect little in the way of responsibility from his purchase. If all goes well he may have that elusive, transient phenomena which can be called a real bargain. More likely, however, he will discover, all too late, that he actually has a poor bargain, or a little less than he paid for . . . B.W.H. Mechanical Rubber Goods are competitive in price, grade for grade, but are never offered with "price only" as their claim for recognition. Long experience, volume production and the most modern methods of manufacture enable B.W.H. to meet legitimate price competition and furnish the kind of quality that means real value to the customer . . . There is true pride behind every brand of B.W.H. Mechanical Rubber Goods.



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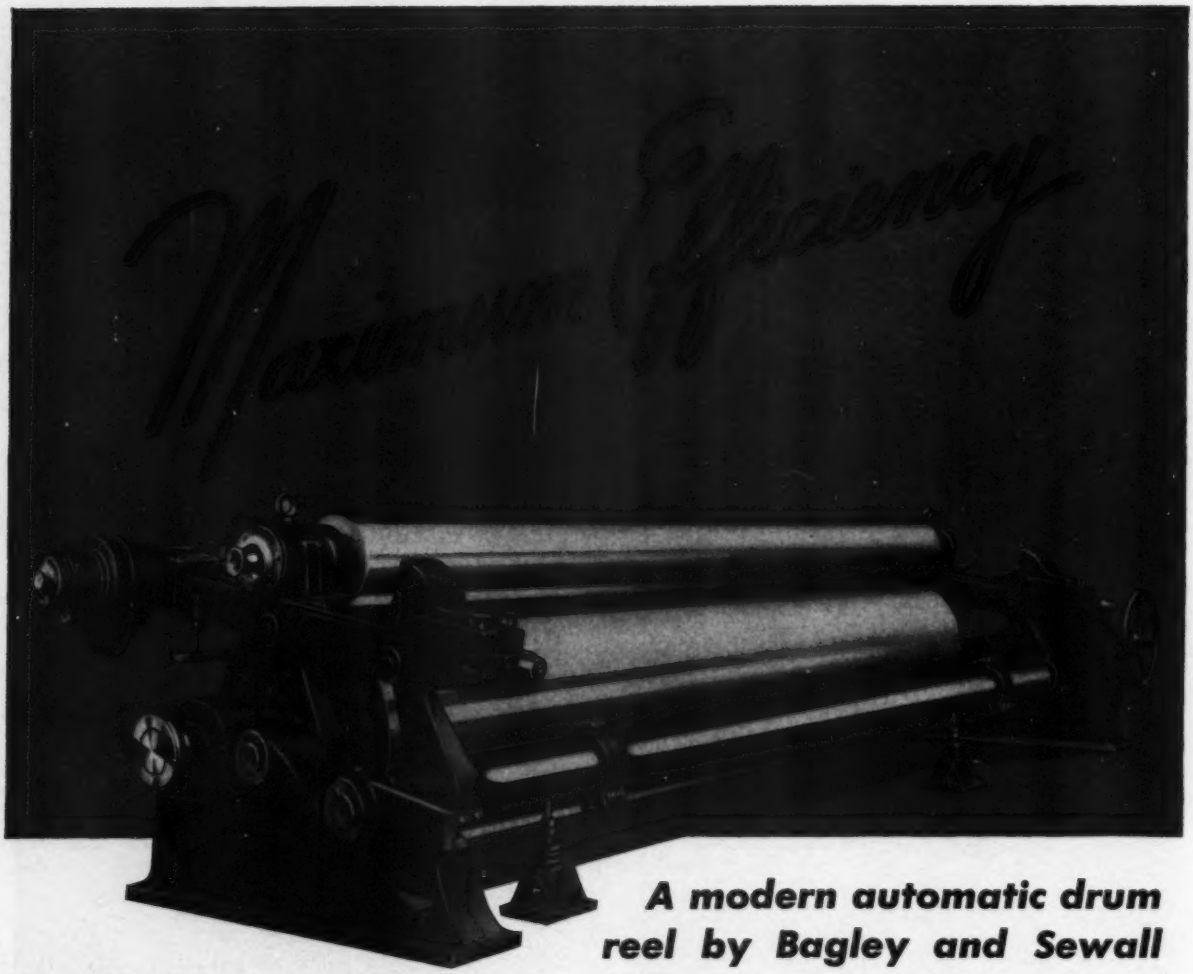


A modern automatic drum reel by Bagley and Sewall

● THE DESIGN of the modern BAGLEY & SEWALL Automatic Drum Reel provides for maximum efficiency in handling paper from the lightest to the heaviest weights suitable for this type of reel. Originally designed for handling light weight tissues at speeds from 800 to 900 feet per minute, for which condition it proved highly satisfactory, it is also giving very satisfactory results on medium to heavier weights. Without exception, all operators using this reel are enthusiastic about its operation, maintaining that it is the most convenient reel that they have ever handled. Each empty reel drum is held in bearings located nearest the calendar stack, and as the roll builds up the supporting bearings automatically move away from the original position, so that the next empty drum may be placed in the initial starting place.

Important features of the BAGLEY AND SEWALL Automatic Drum Reel are: Ease of passing the sheet to the empty reel drum; Uniformity and trueness of running reel drum; Uniformity of tension throughout the winding action; Control of the degree of tension; Convenient means for placing empty reel drum in readiness for changing the sheet from the completed roll to the empty drum.

Write for our latest bulletin which gives detailed information regarding operation of the reel.

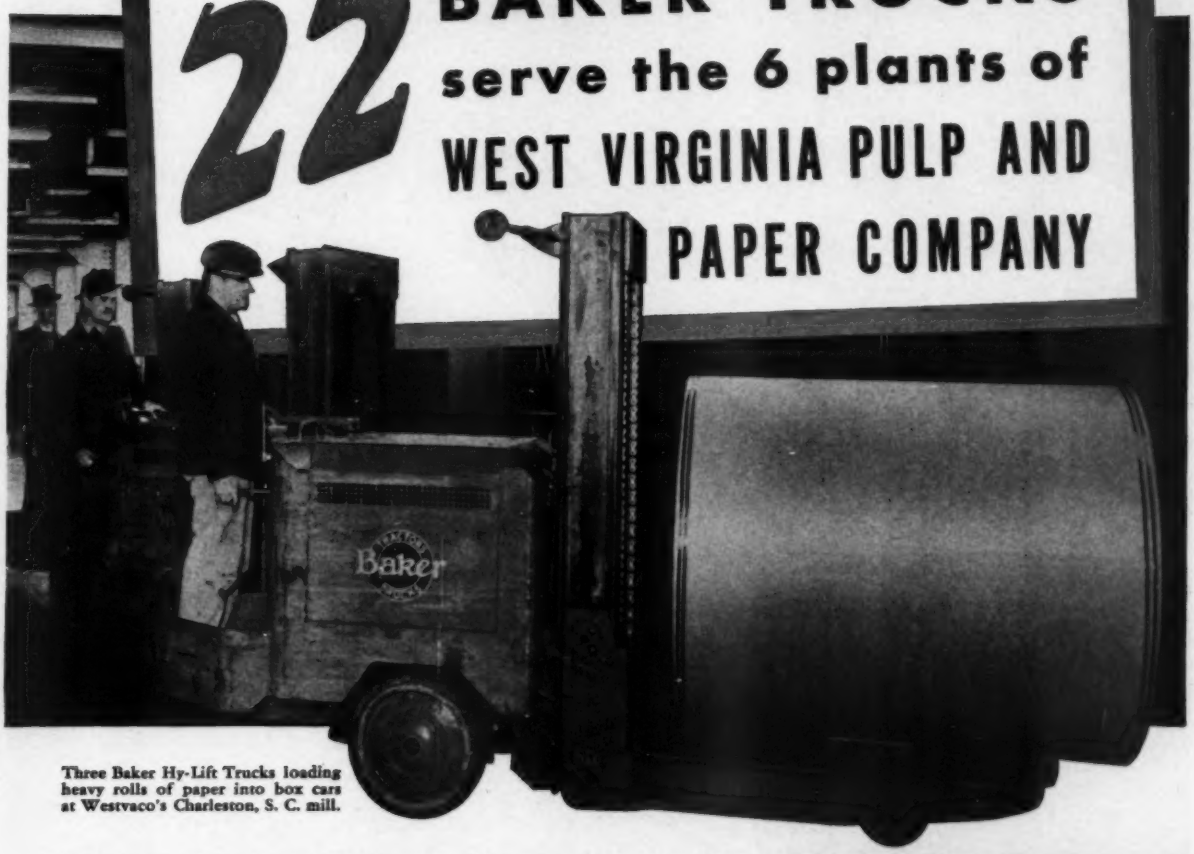
BAGLEY B&S SEWALL

THE BAGLEY & SEWALL CO.

WATERTOWN, NEW YORK

Builders of Paper Machines and Paper Making Equipment

22 BAKER TRUCKS serve the 6 plants of WEST VIRGINIA PULP AND PAPER COMPANY

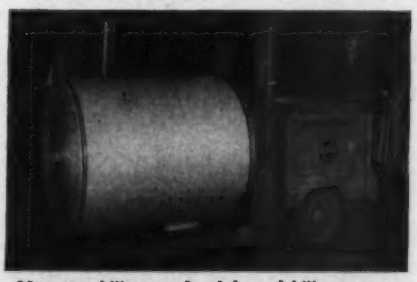


Three Baker Hy-Lift Trucks loading heavy rolls of paper into box cars at Westvaco's Charleston, S. C. mill.

The name "Westvaco" is recognized as a symbol of quality wherever paper is sold, and West Virginia Pulp and Paper Company is known everywhere for its alert business policies. Those who know the company's mills are equally impressed with their modern, efficient production methods . . . Baker points with pride to the 22 Baker Trucks which serve Westvaco — saving time and money by providing faster handling, increased production, more effective use of storage space.

Let us show how Baker Trucks can cut handling costs in your plant.

Tiering rolls inside box cars is no difficult task for this Baker Hy-Lift Truck.



Maneuverability, speed and dependability are outstanding features of Baker Trucks. Model shown has capacity of 6000 lbs.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
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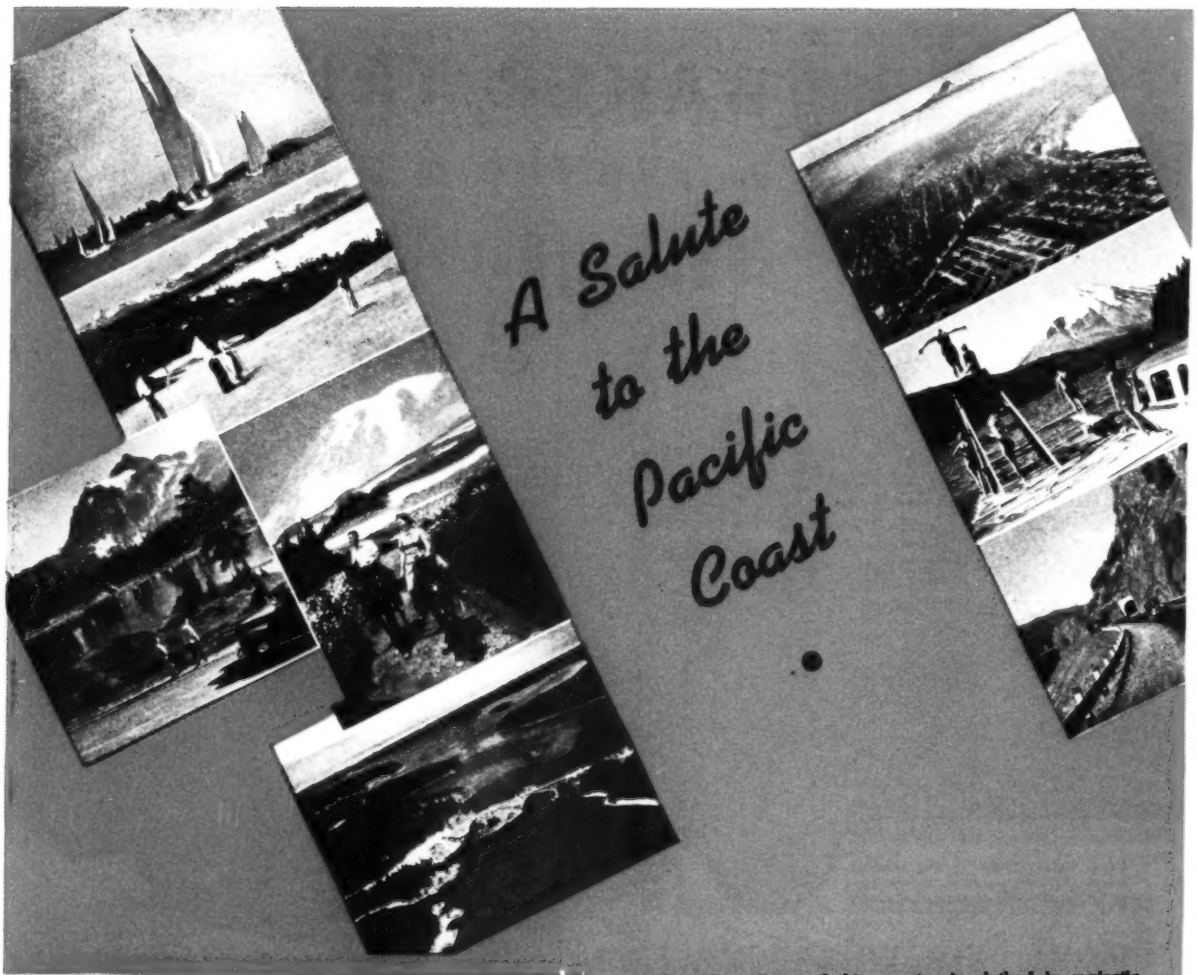
In Canada: Railway & Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS



• The West Coast of this country is clothed in majestic grandeur. There is allure in its scenic beauty that cannot be described by any writer—even pictures of the mountains, waterfalls and towering forests lack the touch of nature.

• The paper industry is proud of the Pacific Coast, for that section ranks high in the industry's pioneer history. The Technical Association of the Pulp and Paper Industry gathered in Seattle last month for the second convention of that body to be held on the Pacific Coast. It was appropriate that this meeting be held in Seattle, for just eleven years ago in that city the Pacific Section of TAPPI was organized.

• The development of papermaking on the Pacific Coast sparkles with highlights.

• Cottonwood was the first wood to be used for pulp on the Pacific Coast. This was groundwood pulp made in 1885 by the Columbia River Paper Company at Camas, Washington.

• The first sulphite pulp to be made on the Pacific Coast was made in 1891 by the Willamette Pulp & Paper Company, West Oregon City (now West Linn).

• The 36 pulp mills on the Pacific Coast, all located in Oregon and Washington, produced 1,384,147 tons of pulp in 1939.

• Paper was made on the West Coast as far back as 1859 when the first papermaking machine to be installed west of the Mississippi River was shipped to a mill in Taylorville, California. The 32 paper mills in California, Oregon and Washington, produced in 1939 an estimated tonnage of 1,128,524 tons.

• And so we salute the Pacific Coast, home of the Douglas fir.

POSITION OF BRITISH PAPER TRADE

▸▸▸ "THE LATEST DEVELOPMENTS in France have not materially altered the situation as far as the industry's raw material imports are concerned. It might be wrong to assume, for instance, that because the Mediterranean has become a combat area supplies of esparto will be in future cut off. There may be obstacles and difficulties, but so long as the Royal Navy continues to exercise its present measure of control in the Mediterranean and so long as shipping facilities can be made available, there is reason to hope that some supplies of esparto will be forthcoming. The latest turn of the War has not affected the position in regard to wood pulp. A limited measure of relief from the present stringent position will come from the supplies imported from North America, but these imports cannot, of course, make up for the virtually complete cessation of shipments from Northern Europe. Home-produced materials are coming forward in increased quantities, but good judges remain of the opinion that considerably more must be done, both as regards collection and use, before the paper trade can be said to be taking full advantage of this class of material. The public too, have been made aware of their responsibilities with regard to the collection of waste materials; and the decision to apply compulsion to salvage collection should certainly stimulate the flow of materials."

Paper Imports and Exports in May

"Though paper and raw material imports in May registered lower figures, paper exports from this country to overseas destinations, despite the shipping difficulties, were well maintained. As showing the greater attention now being given by the country to questions of export it is interesting to notice here that the exports of paper in May exceeded the imports by £136,403, whilst in the corresponding month last year imports exceeded exports by £694,259. Arrivals of all kinds of paper into the United Kingdom last month amounted to £1,011,788, declines of £345,449 (25.4 per cent) and £110,619 (9.8 per cent) contrasted with May of the two preceding years. During January-May shipments of paper to this country reached a value of £8,345,361, a gain of £2,469,713 (42.3 per cent) over the same period last year.

"British paper exported, as already indicated, shows a steady advance in value. In May shipments abroad amounted to £1,148,191, increases of respectively £485,213 (73.1 per cent) and £580,169 (102.1 per cent) compared with May of 1939 and 1938. For the first five months of the year deliveries reached a value of £4,541,-675, which was an advance of £1,673,-605 (58.3 per cent) over the corresponding period last year.

"Shipments of raw materials into the United Kingdom in May represented a value of only £554,483, figures which record substantial declines against the same month last year and the year before of respectively £917,-169 (62.3 per cent.) and £606,674 (52.2 per cent.). Figures for the five months ended May amounted to £6,741,674, an increase of £855,609 (14.5 per cent.) over the same period last year, but a decline of £508,306 (7 per cent.) when placed beside the returns for the corresponding five months of 1938."

The General Outlook

"Recent events in the military field make it clear that paper makers in this country are going to have a very difficult task. Today our question is not whether any or all paper making firms can survive the War. The question must be how is this country going to be supplied with paper at all? Probably before these lines are in print we will have seen the opening of the German campaign directed to bring Britain to her knees. . . . Even should this be successfully broken it is certain that no shipping will be brought to this country which we can do without by any possible means within our power.

"In addition it is perfectly clear, that as the industrial activity of France has come to a stop, increased quantities of war materials of all types will have to be imported from the United States, and that all the shipping and currency which can be so used will be needed for bringing guns, ammunition, aircraft, food and other vital necessities.

"Under these circumstances paper-making materials, except that amount of sulphite pulp which is required for the maintenance of our explosive industries, probably will have to be again drastically reduced. It will become a problem for such people as the writer and his readers to find out how to supply sufficient paper in this country to allow us to continue the protracted War which the Prime Minister has predicted.

"The writer must therefore take this opportunity of urging the authorities to call into being all the ingenuity, determination and inventiveness of the paper makers of this country. Give us a chance to show what we can do by using home-produced materials and other substitutes. With the United States and Canada short of pulp to produce their normal amount of paper and with the export of paper shut off from so many continental countries who have largely dealt with this trade in

The American Paper and Pulp Association has released the accompanying article which is made up of excerpts from report received from the office of the United States Commercial Attache in London which describes the current pulp and paper situation in Great Britain. This report was furnished through the courtesy of the Forest Products Division of the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

the past, it will not be very long before export markets will be begging for paper of any sort which can be supplied. Should we therefore be able to produce paper from home-produced materials more than the bare minimum which is required to keep our Government, fighting services and industrial organizations working at efficiency, we will have ready markets to which we can export our surplus production on ships which may otherwise be leaving our shores empty. Only please let us try."

Compulsory Salvage

"The Ministry of Supply has announced that all local authorities with populations exceeding 10,000 will be required to arrange efficient systems of collection. All householders in the areas of these local authorities are to be required to co-operate in a new nation-wide anti-waste campaign.

* * *

"Waste paper and cardboard, scrap metals, and bones are most urgently needed. Other materials, such as waste food and rags, may be added to the list from time to time."

The Wood Pulp Position

"In the case of chemical pulp, business in sulphite is being done with Canada and the United States, and in recent weeks the shipping position on the North Atlantic route appears to have been a little easier.

"It remains to be seen whether the events in France and the more-than-ever urgent need for supplies of weapons and ammunition from North America will again produce a position of extreme stringency in regard to cargo space on the Atlantic route.

"The case of mechanical pulp remains acutely difficult.

"Moist pulp is hardly an economical cargo at a time when all shipping space is precious, but efforts are being made to secure supplies of dry mechanical pulp for transportation to this country."

NOTES BASED ON INTERVIEWS IN THE TRADE

General

There has been no great change in the position in the paper trade as described in the reports submitted a month ago, in spite of the very important developments which have taken place in the military situation in France. It is quite possible that the paper trade, like many other trades, will experience new difficulties arising out of the occupation of the Channel ports and the expected intensification of attacks by air on British ports and shipping. But it is too early yet to attempt any estimate of the importance of these factors so far as the paper trade is concerned. The greater burden which will probably be thrown on the dock facilities at certain ports in the country will be a factor of some importance, as would also be any intensification of submarine warfare. But in most respects the overrunning of France by the Germans, the entry of Italy into the War and the capitulation of the French Government, have had relatively little significance for the paper trade as compared with the German invasion of Norway. The effect on the paper trade of the almost total cutting off of Scandinavian supplies has been seen in the elimination of quotas and the drastic restrictions on the use of paper made in the various Paper Control Orders issued during the month under review. The following outline will show some of the main changes or developments which have taken place under the various headings covered in last month's report:—

Wood Pulp Import Supply Position

A trickle of wood pulp in small quantities has been arriving from Canada, mostly in the form of a mixture consisting of 80 per cent unbleached sulphite and 20 per cent mechanical, i. e., groundwood pulp, in the form of rolls, air dried. This mixture of pulp is said to be suitable for the manufacture of newsprint or coarse wrapping papers, but not for the finer grades, such as book printings, writings or tissues. The imports from Scandinavia have been limited to a small number of Finnish vessels which have been able to load at Petsamo, in Northern Finland. The pulp for these vessels has been transported to Petsamo by motor lorries, as there is no rail connection between the mills and this port. One of the Finnish steamers has already reached Great Britain and four more are expected to arrive between now and the middle of July.

The position regarding Russia has not changed and there is no expectation of pulp or pulp wood supplies from this source to Great Britain.

Position of U. K. Paper Mills

According to information from trade sources, U. K. paper mills are now operating, on the average, at only about 15 per cent of normal capacity; on this basis the existing stocks of material will enable these mills to work, on the average, until mid-July.

Present Stock Position

In view of the reduced working time, the stocks of newsprint and paper-making materials on hand will extend beyond the periods mentioned in our last report. On the present basis, it is estimated that the stock position is about as follows:—

Newsprint paper—22 weeks.
Pulp for writing and higher grade printing paper—2 to 3 weeks.
Pulp for container boards—approximately 3 weeks.
Pulp for tissues, etc.—possibly 3 weeks.

Newsprint Supply Situation

One steamer load of newsprint from Newfoundland has arrived at a West Coast port and steps for the landing, storage and distribution of this paper are being actively pursued. British newsprint mills have been asked to co-operate in the distribution to the smaller newspapers outside London and the publishers have been requested to nominate the particular British mill through whose agency they would like to have their allotment of Canadian paper supplied.

Availability of Paper Supplies from U. S. A.

Trade with the United States is still presenting difficulties, as regards price quotations, American mills being generally unable to quote on any other basis than f.a.s., and also usually stipulating that irrevocable letters of credit must be established before an order can be placed. There have been some cases where mills required payment against delivery on board railway cars. As facilities for obtaining Canadian or American dollars cannot be obtained unless the authorities can be convinced that the purchases are war essentials, the problem of selling any grades of American or Canadian paper other than the newsprint already arranged for, is obviously a difficult one.

Waste Paper from U. S. A.

According to trade information here, the home demand for waste paper in the United States appears to have dried up most of the offers from East Coast shipping points. Although there has been some interest shown in the British market by certain Pacific Coast waste dealers, information here is to the effect that since September 1939 a considerable trade in waste paper from Pacific Coast ports to the Eastern United States mills has developed, so that it would seem probable that any waste paper available on the West Coast would go to these Eastern United

"Hey, scram offa my cake!"

...SAYS THE CHEF ON PAGE 49 TO THE PELICAN ON PAGE 50

"I'd like to," says the Pelican, eyeing the cake hungrily, "but I can't. I'm *show through*... from the next page, you know."

"Then pleez go back!" screams the Chef.

"I can't," says the Pelican, slicing himself some cake. "Why don't you speak to the paper manufacturer?"

"Oooooh, I am speechless, pig of a fowl!"

"But you *must* tell him about Krebs Pigments. And how they take *show through* out of even thinnest paper."

"Is it *opacity* you mean, that would fly away those dirty feet from my beautiful cake?"

"That's right," answered the Pelican, gulping some cake; "those Krebs Pigments will make the paper as clean, white and bright as this luscious cake—with sharp, clear printing on both sides."

"I pray this Krebs will remove you queek," moans the Chef.

"It's easy. Krebs will help with all the technical information needed," says the Pelican. "They've pigment colors for paper, too. You just write."

KREBS PIGMENT & COLOR CORP.

1007 Orange Street...Wilmington, Delaware

States mills rather than to the United Kingdom.

No progress has been made for the installations for de-inking waste paper, mentioned in a previous report, chiefly because the restrictions on manufacturing equipment and plant are very severe unless the material is wanted for essential war purposes.

Home Produced Material

A number of schemes for the utilization of straw, reeds and sub-tropical grasses are being put forward, but with the exception of straw which can be suitably treated in existing plants for treating esparto, no real progress has been made.

Paper Control Restrictions —Economies in Use of Paper

During the second rationing period, June, July and August, deliveries from the mills to ordinary customers are expected to be roughly about 15 per cent of the amount consumed in the pre-war reference period, and some grades of paper have been entirely prohibited when existing stocks in process are worked up. Although the order of priority mentioned in our Report No. 345—namely, (1) Government orders, (2) Export orders, (3) Home consumption—still holds good, it is to be noted that the Paper Controller is very reluctant to grant any licenses for any export other than for very high priced papers, on the ground that it would be uneconomic to export from Great Britain any quality of paper which would cost much more to replace by imported paper of the same quality. Further restrictions are also being placed on the consumption of newsprint under the Control of Paper (No. 19) Order, 1940, effective July 1. The effect of this Order will be to limit the size of newspapers sold for a penny each to thirty-six pages a week, instead of forty-eight; and of newspapers sold for twopence, like the "Times", to sixty pages instead of seventy-two. The Order also prohibits the return of unsold copies of newspapers except under license by the Minister of Supply. This Order was originally planned to go into effect June 24, but was postponed for a week in order to give newspapers an opportunity of adjusting with their advertisers the available space in the smaller paper.

Price Policy of Paper Control—Paper Order No. 18

Some manufacturers complain that the price policy of the Paper Control is based on the view that prices must be kept down in the interests of the consumers, no matter what happens to the manufacturer. The Control price for newsprint paper, they contend, is still below the cost of manufacture in the United Kingdom, based upon existing Control prices for pulp.

The Paper Controller has recently issued the Control of Paper (No. 18) Order, which provides that the extra cost of transporting existing mill stocks of newsprint paper from dangerous areas, such as East Kent, to other localities and then redelivery to the customer, may be added to the Paper Control price. The relocation of these stocks has been confined so far to the mills in East Kent, and has not extended to mills in the North or West.

Question of Paper Exports

According to one trade source, the efforts of the so-called "Export Group" (formed under the general export scheme of the Board of Trade) to obtain pulp for the manufacture, and licenses for the export, of paper goods, have not met with much success—particularly in the case of lower priced papers.

◆

M. AND O. FLOAT WINS FIRST PRIZE

Portraying the bond of unity and friendship that exists between the American and Canadian peoples, the huge and beautifully-decorated float of the Minnesota and Ontario Paper Company took first prize at the recent Minneapolis Aquatennial (see photograph).

Enthusiastically acclaimed by more than 250,000 persons who thronged the streets over which the four-hour parade of more than 90 floats passed, the flag-adorned float was returned the winner over forty other outstanding entries. In the center of the boat stood a monstrous red, white and blue ball emblematic of the earth and on each side of it a reproduction of the New World. On the float were four beautiful girls in Aquatennial uniforms.

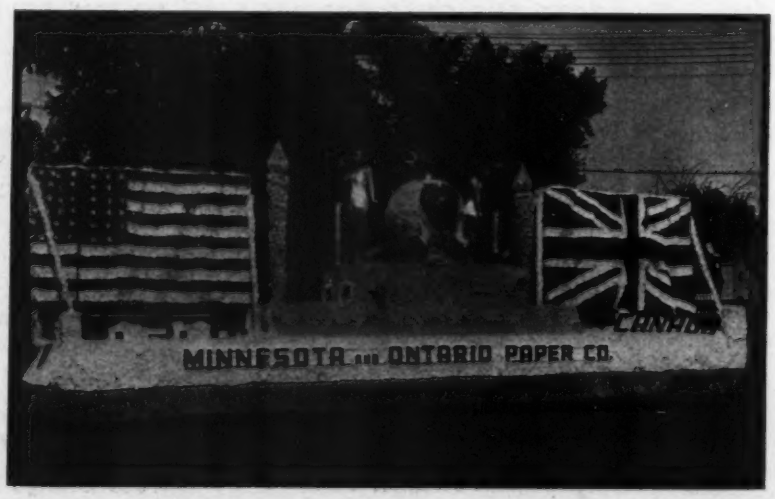
◆

CANADIAN INST. TO CONTINUE RESEARCH

A new five-year agreement between the Dominion Government, McGill University, and the Canadian Pulp and Paper Association for the operation of the Pulp and Paper Research Institute, in Montreal, was announced on August 20. A clause makes the agreement renewable for further similar periods at the option of the parties concerned.

Under the new agreement the Institute's work will be co-ordinated into one comprehensive plan of research and development. The Institute's general administration will be vested in a joint committee comprising representatives of the Government, the University and the industry. The chairman of the committee is R. L. Weldon, president of Bathurst Power and Paper Company. Dr. O. Maass, head of the chemistry department at McGill University, has been appointed director of the Institute and he will be assisted by Dr. W. Boyd Campbell as director of technical research. Dr. Harold Hibbert, professor of industrial and cellulose chemistry at McGill, will continue to devote his whole time to the work of research for the industry.

The Institute was established by the Canadian Pulp and Paper Association in 1927 at a cost of some $325,000 to carry on research and development work to improve the Canadian pulp and paper industry in relation to world competition.



OLIVER

"Streamlined" RUBBER-PROTECTED BLEACH WASHER

OLIVER

"Ring Valve" BLACK LIQUOR WASHER

Announced but a few months ago, 13 units already have been sold...

Sold to companies in position to take advantage of the superior design and construction of these 1940 types. Six of the thirteen are already in operation and more than fulfilling expectations.

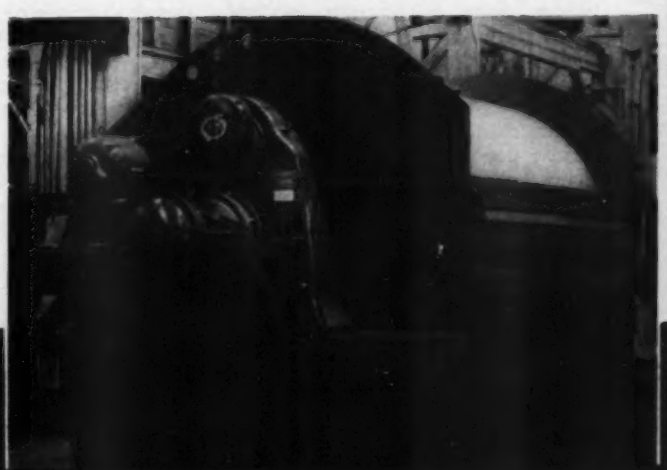
Here are some of their distinctive features:

The Streamlined Rubber-Protected Bleach Washer, designed particularly to distribute the vacuum effectively throughout the entire section, provides quick drainage and allows long washing period. Also, directional sprays gently flooding the sheet and scouring the fibres, short liquor travel to central outlets, clean discharge, adaptability to thick or thin sheets and intermittent feed.

The Ring Valve Black Liquor Washer provides two-stage counter current washing on a single unit, minimum restriction to flow of filtrate, uniform thickness of sheet formation, short liquor travel to center outlets making possible better separation of solutions, high washing efficiency, simple external valve adjustment, minimum foaming due to separation of air and liquor in drum.

From every angle, these filters are TOPS. Their better results and superior design insure bigger returns. You need them in your mill.

Oliver "Streamlined" Rubber-Protected Bleach Washer



OLIVER UNITED FILTERS

WASHINGTON

▶▶▶ THE NEW GOVERNMENT EXPERIMENT laboratory which will be opened at Peoria, Illinois, shortly, (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 440, August, 1940) will give special attention to the development of synthetic products from corn for use in the national defense program, a news report stated. At least a dozen technicians will work on the production of plastics, substitute fibers and supplementary motor fuels.

▶▶▶ WOOD PULP SUPPLIES will be sufficient for 1941, the defense commission reported recently. There will be no government-sponsored program for new mills for the present, the report stated. Edward R. Stettinius, Jr., commission member in charge of raw materials, said that increased domestic production, imports from Canada and increased use of waste paper would offset a decline in shipments from Scandinavian countries.

▶▶▶ THE PLANNED FEDERALIZATION of the National Guard will effect a considerable number of paper mill employees. Many paper companies are planning to equalize the pay of such employees as are called by making up for a limited time the difference between their army pay and the wages they received in commercial employment. Allied industries, it was said, are also following this plan. Although legislation proposes to require employers to take back into their employ any men called to military service after their service is ended, most mills have given such assurance of future re-employment without waiting for official orders from Washington.

▶▶▶ A BILL TO PROVIDE $50,000 for a pilot plant to carry on experiments toward the utilization of spruce bark and hemlock in the production of tanning extracts, was introduced recently by Representative Smith of Washington.

▶▶▶ POSTERS ACCEPTABLE to the Wage and Hour Division of the Department of Labor in complying with the order of the administrator setting the 40-cent minimum for the pulp and primary paper industry have been issued by the Government Printing Office.

INSTALL HUMIDITY ROOM AT NEPCO

A new constant temperature and humidity room has been installed in the Port Edwards (Wisconsin) mill of the Nekoosa-Edwards Paper Company where routine machine-side tests for those properties of paper which are subject to variations with atmospheric conditions are now being made.

Tests which are not affected by humidity conditions are performed in a testing station immediately outside the humidity room, thus centralizing all the paper testing and control work in a centralized control station where the results are constantly available to the machine operators.

The humidity room will be maintained at 70 deg. Fahr. with a relative humidity of 50 per cent, which is considered standard for the majority of paper laboratories, the government printing office, and average printing plant conditions. For special test work the relative humidity can be raised to 65 per cent, which is the present TAPPI standard.

A large double glass window separates the humidity room from the testing station. In a rack inside this window are placed the records of performance on the four machines so that the tests can be inspected at frequent intervals by the machine operators. Samples for testing in the humidity room are passed through a slot in order to avoid changes in room conditions which would result from frequent passage through the double door opening into the control room.

In constructing the new humidity room, the walls, ceiling, and floor were insulated with a double thickness of insulation which was moisture-proofed on the inside by the generous application of asphalt sealing composition. The walls and ceiling of Masonite pressed wood and the flooring of linoleum were installed over this insulation. The lighting is of the most recent fluorescent type, providing the best obtainable approximation of average daylight, so arranged that there is a uniform illumination of forty foot candles at the level of the testing tables.

Air conditions are maintained by a circulating system delivering air through a duct near the ceiling and providing a complete circulation of air every five minutes. The fans draw air from the room over cooling and dehumidifying coils, and return the air over a heating coil and humidifying arrangement. Thermostatic controls hold the temperature within one degree of variation, and humidity does not vary more than 2 per cent.

◆

PUGET SOUND CO. PLANS ADDITION

Construction of a new addition to the Puget Sound Pulp & Timber Company, is now under consideration by company officials. The cost of the addition, is set at $1,500,000 and would increase the company's capacity to produce unbleached sulphite pulp from 100,000 to 150,000 tons a year. Officials estimate the plant would be in operation for ten months next year and would earn a net profit of $1,200,000 on capacity output in that time.

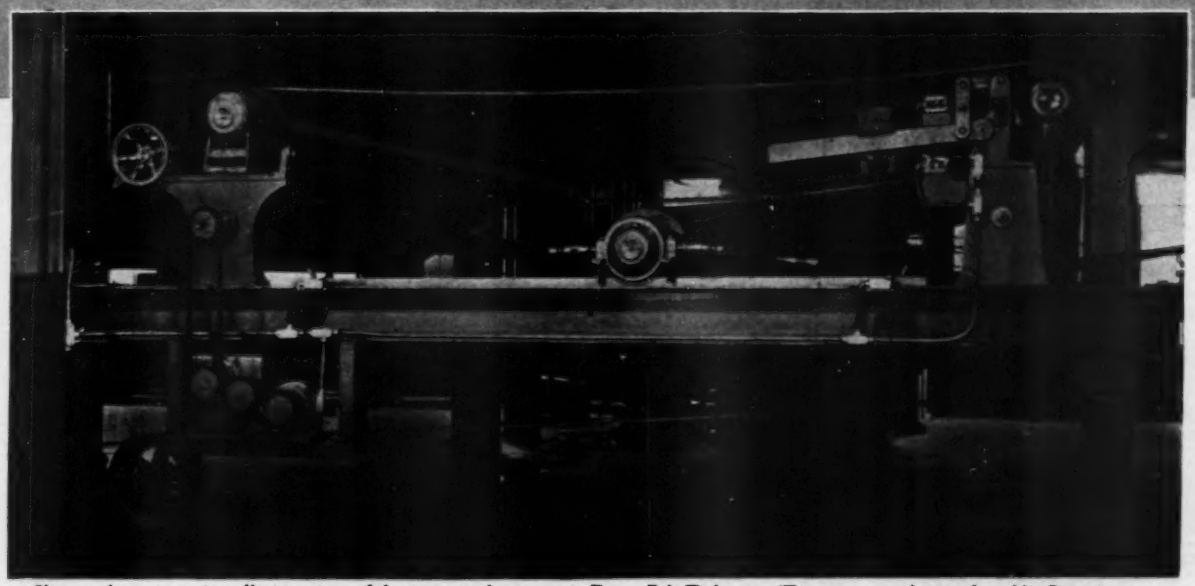
◆

INDUSTRY NOW HAS DEFENSE COMMITTEE

An industry committee to represent the paper and pulp manufacturers of the United States has been named by the American Paper and Pulp Association as its representative on problems of national defense, and particularly for contact with the Advisory Commission to the National Defense Council, in which Thomas B. McCabe is the paper industry representative. The Industry Committee's contacts on national defense matters will be through Mr. McCabe, and the committee consists of: R. A. Hayward, president Kalamazoo Vegetable Parchment Company, as chairman; W. J. Alford, Jr., treasurer Continental Paper Company; R. J. Cullen, president of International Paper Company; C. B. Morgan, vice president of Rayonier, Inc., and F. J. Sensenbrenner, president of the Kimberly-Clark Corp.

The formation of this committee is the direct result of an industry conference with Mr. McCabe in July, at which notable decisions were reached with regard to the co-operation of the paper and pulp industry in matters of national defense.

. . . now automatic dryer felt tightening is available for new or old machines . . .



Shown above is an installation view of the improved automatic Dryer Felt Tightener (Trempe patent) introduced by Puseyjones.

HERE'S an end to curled and cockled paper resulting from dryer felt irregularities. After seven years of test installations, Puseyjones introduces a tensioning apparatus for improving paper in the drying—the automatic Dryer Felt Tightener.

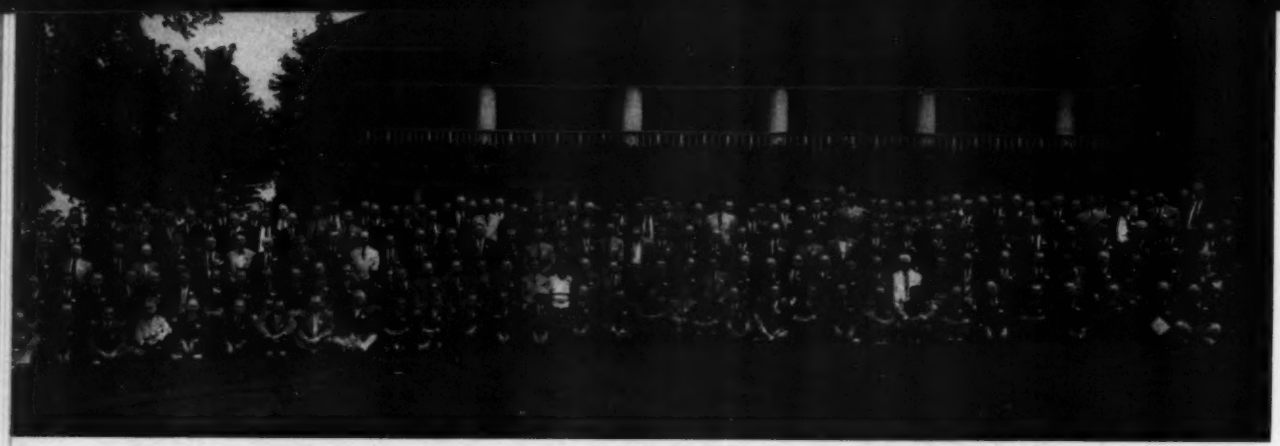
The automatic Dryer Felt Tightener maintains uniform pre-set tension of the dryer felt to the dryer surface without any attention on the part of the operator. Eliminates tight or loose felts. Easier on felt seams. Eliminates all hanging weights. Holds the paper firmly against the dryer surface . . . at all times, under all conditions. Increases dryer felt life by eliminating strains. Reduces friction on felt carrying rolls and bearings.

The Automatic Dryer Felt Tightener is available for new or old machines. It is now in operation in some of America's greatest mills. Write us for further facts.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-making Machinery. Wilmington, Del.



Group of representatives attending the annual Hammermill conference held at the Kahkwa Club in Erie, Pa.

HAMMERMILL HOLDS ANNUAL CONFERENCE

The Twenty-ninth Annual Conference between Hammermill Paper Company officials and the mill agents was held August 21-23 at Erie, Pennsylvania, with more than 130 merchants attending. Distributors from all sections of the country were represented at the annual affair.

The 1940-41 plans of the Hammermill sales and advertising departments took up a big share of the two business sessions at the Kahkwa Club on Thursday and Friday mornings. Both meetings were opened and presided over by Norman W. Wilton, Hammermill's first vice president and general manager. Talks were given by Donald S. Leslie, vice president and assistant general manager; Harris R. Baldwin, vice president in charge of sales; A. Ellis Frampton, advertising manager and assistant general sales manager; J. Fred Wuenschel, district sales manager for the Pacific coast, and C. P. Bothwell, Hammermill cover specialist.

Recent mill improvements were outlined by Mr. Leslie and sales programs were discussed by Mr. Baldwin. Mr. Frampton gave a dramatic presentation of how Hammermill advertising backs up efforts of the merchants' salesmen. New developments in Hammermill's cover line were reported by Mr. Bothwell. Mr. Fuenschel reported on activities at the Grays Harbor Pulp and Paper Company.

One of the features of the program was a series of mill inspection trips during which guides pointed out the most recent developments in Hammermill's program of mill improvement and modernization.

The E. R. Behrend golf trophy was won this year by W. N. Stetson, Jr., of the Storrs and Bement Company, Boston. Mr. Stetson also won a gold putter offered by agents. C. M. Yates won the gold putter offered by visiting agents. A beautiful Mexican tray, won by Bert Claridge, was presented for a drawing by mill men by Elwin Walker of Walker-Goulard-Plehn Company, export agent for Latin America.

FINANCIAL

In a stock market which is unprecedentedly dull, and which is marked by an utter failure of securities of prosperous corporations to reflect increased earnings, paper mill securities have shown little change in the past month. In the face of a percentage of production which does not show the usual amount of summer reduction, and with pulp supplies becoming steadily tighter, only a few paper mill securities have risen perceptibly in recent weeks. Earnings reports, however, are on a pleasantly high basis.

Brown Corporation—Earnings for the 32 weeks ending July 13 were $983,467, as against a loss of $1,304,000 for the comparable period the previous year.

Consolidated Water Power and Paper Company—Net earnings for the first six months of 1940 were $1,061,663, almost doubling the net for the same period of 1939 of $574,958.

Container Corporation of America—Earnings for the year ending June 30 were $2,545,386, as against $181,970 for the previous year.

Continental-Diamond Fibre Company—Net profit for the first six months of 1940 were $247,470, as against $26,889 for the same period in 1939.

Crown Zellerbach Corporation—The fine profits made in the past two years have enabled the company to refund $12,000,000 in bank loans, reducing the interest rate from 3.3 to 2.07 per cent.

Dixie-Vortex Company—Net for the first half of 1940 was $835,007, as against $819,978 for the same period in 1939.

Eastern Corporation—Net loss for the first six months of 1940 was $15,190, as against a net income for the same period of 1939 of $38,135. Net income for the second quarter, however, was $22,364.

Eddy Paper Corporation—Net earnings for the first half year of 1940 were $205,663, as compared with $62,851 for the same period in 1939.

Robert Gair Company, Incorporated—Net profit for the first six months of 1940 were $437,905.

Gaylord Container Corporation—Net earnings for the June quarter were $442,546, as against $112,637 for the same quarter in 1939, and the half year earnings were $643,699, as against $236,528 for the first half of 1939.

Great Northern Paper Company—Net profit for the six months ending June 30 were $1,426,155, as against $688,249 for the same period in 1939.

International Paper and Power Company—Net profit for the June quarter was $5,938,859, as against $77,739 for the same quarter of 1939, and the half year net is nearly $9,000,000 as against less than $100,000 for the first half of 1939.

Kimberly-Clark Corporation—Bank loans and a privately sold bond issue of $12,000,000 has refinanced outstanding obligations of $9,000,000 and provided $3,000,000 for expansion.

Minnesota and Ontario Paper Company—Net earnings for the first half year were $1,120,787, as against $238,936 for the same period in 1939.

Nashua Gummed and Coated Paper Company—Net earnings for the first half of 1940 were $130,241, as against $35,794 for the same period in 1939.

National Container Corporation—Net profit for the half year was $562,872, as against $87,946 for the same period in 1939.

Oxford Paper Company—Net earnings for the six months ending June 30 were $434,134, as against $227,548 for the same period in 1939.

Puget Sound Pulp and Timber Company—Net profit for the first half of 1940 was $618,143, compared with a loss of $14,821 same period in 1939.

Soundview Pulp Company—All existing indebtedness has been wiped out by a prepayment of $520,000 due in

Taken Apart for Your Inspection

NOW See Why G-E Direct-current Motors Meet the Tough Requirements of Paper Mills

NOTE THESE FEATURES!

THE FRAME

1. Rolled steel. Bored throughout its length.
2. Substantial 360-degree rabbet fit.

FIELD COILS

3. Held firmly in place, assuring freedom from chafing. G-E bonding varnish cements the coils into a solid mass. High resistance to foreign matter prolongs life of the windings.

END SHIELDS

4. Provide mechanical protection and rigid bearing support. End-shield openings can be readily covered with flat plates or perforated covers.

ARMATURE

5. Shaft readily removable.
6. Form-wound, pretreated coils. Mica tubes wrapped around slot portion. Coil receives several impregnations of G-E insulating varnish, which is baked on after each dipping. The result is a heat- and moisture-resisting insulation that is both tough and flexible.
7. High-grade, silicon-steel laminations.
8. Commutator is built up of copper segments.

BRUSH RIGGING

9. Brush yoke clamped in position and easily adjustable.
10. Brush holders easily adjusted to maintain proper setting.

BALL-BEARING ASSEMBLY

11. Cartridge-type ball bearings exclude dirt even when the motor is disassembled.
12. Convenient pressure-gun fitting and relief plug permit lubrication and flushing of bearings without motor shutdown.

WE WANT you to look at the parts of a typical General Electric d-c motor (Type B, 284 frame) and see for yourself how well suited it is for service in paper mills.

As you study the illustrations, remember that G-E direct-current motors provide such advantages as long bearing life, excellent commutation, a highly protective insulation with remarkable bonding qualities, easily accessible brush rigging, and a convenient lubrication system.

These General Electric motors are available in a wide variety of standard ratings, speeds, and enclosures. Thus they will meet practically any paper-mill condition requiring an industrial-type d-c motor. Our nearest representative will be glad to give you complete details. General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC

1944. At the end of 1939 the outstanding indebtedness was $1,040,000.

Union Bag and Paper Corporation—Net earnings for the second quarter were $867,273, as against $78,874 for the same quarter of 1939, and for the year ending June 30 the net was $2,299,872, as against $575,019 for the previous year.

S. D. Warren Company—Earnings for the first six months of 1940 were $199,454, as against $139,885 for the same period in 1939.

New York Stock Exchange—Stocks

	Closing Prices	
	Aug. 26 1940	July 25 1940
A. P. W. Paper Co...	2⅜	*1¾–2⅜
Celotex	6	6½
Same Preferred	*50–57	*53–58
Certain-Teed	4	*4¼–4½
Same 6% Pref.	21¼	.....
Champion P. & F. Co.	22⅜	*22–23
Same Preferred	*102–105	.....
Container Corp.	13½	13⅞
Cont. Diamond	5⅜	*5¾–6
Crown Zellerbach	14¼	14⅛
Same Preferred	85½	*87–90
Dixie Vortex	10	11
Same "A"	33¼	*33–34
Robert Gair	2⅜	*2½–2¾
Same Preferred	12½	*11⅛–11¾
Gaylord Container	11¾	*9⅜–11
Same Preferred	*47–55	*47–45
International P. & P. Co.	14¼	*12–12¼
Same Preferred	58¼	46⅞
Kimberly-Clark	*33–34¼	*31⅛–32¾
MacAndrews & Forbes	29	27¾
Masonite	25½	*24½–25
Mead Corp.	8⅜	*8½–8¾
Same Preferred	*77–80	*79–80
Paraffine Co.	32¾	.....
Same Preferred	*94–98½	*90–97
Rayonier	16¼	15
Same Preferred	27⅜	*27½–29½
Scott Paper	38	39¼
Same 4½% Preferred	113	*112⅜–114
Same 4% Preferred	106½	.....
Sutherland Paper	*23–24⅜	*24¾–25½
Union Bag & Paper	11⅜	10⅜
United Paperboard	*3⅛–3¾	.....
U. S. Gypsum	69	61⅜
Same Preferred	182	*175–182

New York Stock Exchange—Bonds

Certain-Teed 5½%..	78	.....
Champion P.& F.Co.	102¼	.....
Inter. P. & P. Co. 5%	102¾	.....
Same 6%	102½	101

New York Curb Exchange—Stocks

Am. Boxboard	4½–4¾	.....
Brown Co. Pfd.	*17–19¾	*16½–18½
Great Northern	40½	*41½–42½
Hummel Ross	6¾	5½
Nat. Container	10¾	*8½–9⅞
St. Regis	3	2½
Taggart	3¼–3½	*2⅜–2⅞
United Wallpaper	1⅜	.....

*Closing Bid and Asked Prices.

GEORGIA MAY GET TWO MILLS

The rumor of a new pulp mill in Georgia has been given factual strength by the recent announcement that application for incorporation of the newly-formed St. Marys Kraft Corporation was filed in Camden County. The corporation is planning the erection of a new pulp mill at St. Marys, Georgia. Another rumor concerns a proposed pulp mill at Valdosta, Georgia, (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 440, Aug., 1940).

The St. Marys Kraft Corporation has an authorized capital of $1,000,000 and, according to an item in *Construction*, was incorporated by Isaac and Charles Gilman, president and vice president respectively of the Gilman Paper Company, Gilman, Vermont, and Morris Gintzler. The charter is of the usual type, providing for the corporation to engage in the paper and pulp industry and in the paper and chemical industry.

Full details have not as yet been announced as to the construction of the mill at St. Marys but it is reported that preliminary work has advanced to a stage whereby the Camden County port is assured as a site. It is understood that Camden County will vote on $10,000 bonds for the site.

No statements are available as to the rumored mill at Valdosta, Georgia, although a Georgia paper stated well-informed sources were of the opinion that options on land in that district's Mayday section have been secured. It is reported that C. H. Murdick, representing Allied Industries, Inc., New York City, has been investigating various sites. He has been accompanied by F. H. Brown, vice president of the Georgia, Southern and Florida Railway. The proposed pulp mill, it was stated, would have a capacity of 150 tons per day and would be located east of Valdosta on the Alapaha River.

◆

PLAN INLAND PORT ON COLUMBIA RIVER

Easier shipping facilities for Northwest pulp, paper and lumber companies are in the offing with the construction of an inland port at Camas and Washougal, Washington, located 128 miles up the Columbia River from the Pacific. The new port is expected to be ready by next April.

This development, just 21 miles below the huge Bonneville dam, is being undertaken by WPA crews who will construct a dock 110 feet wide and 480 feet long which will ultimately be extended to 960 feet. Other work will include the construction of a transit shed, installation of a marine elevator and construction of bulkheads, floats and riprapping.

The Crown Willamette Paper Company, one of the largest industries in the Columbia River territory, now barges 80 per cent of its daily output of 525 tons to Portland, Oregon, for transhipment. Lumber from the recently-enlarged mills of the twin cities is now trucked to Vancouver for reloading and the Washougal Woolen Mills have been importing all their raw wool by rail. Port officials predict that a saving of 50 per cent in freight costs on the wool shipments will be possible through water transportation when new facilities are available.

The development was made possible by a WPA allotment of $105,560 and a contribution of $60,310 by the Port of Camas-Washougal.

◆

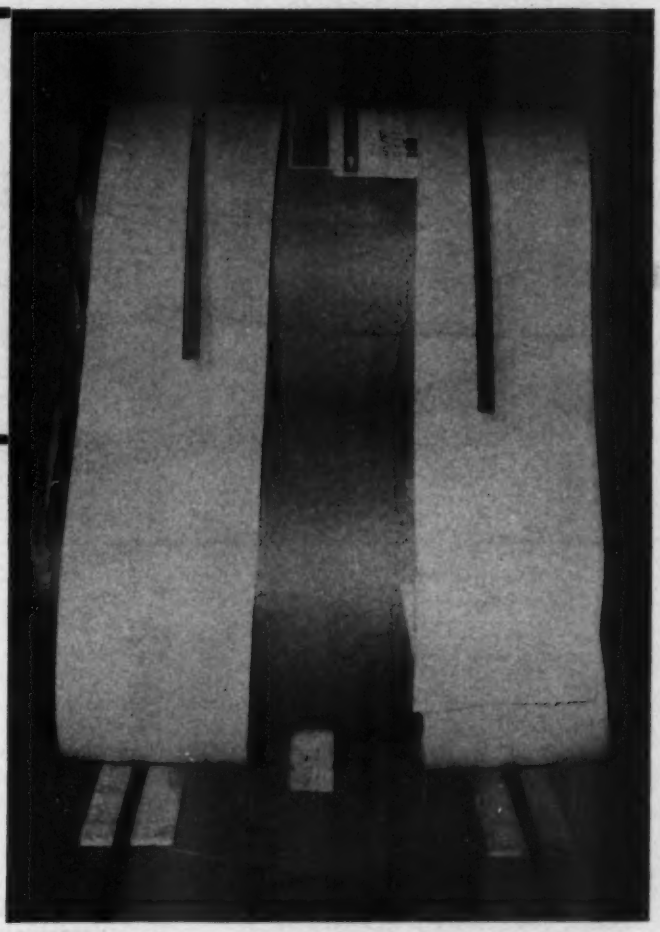
CANADA IMPOSES NEW IMPORT TAX

Warren B. Bullock, manager of the Import Committee of the American Paper Industry has reported the imposition of a 10 per cent war tax on all imports from countries other than Great Britain and the British dominions. Mr. Bullock states that despite the provisions of its Reciprocal Trade Agreement with the United States, Canada by act of Parliament has levied a 10 per cent "War Exchange" duty on all imports except certain non-commercial merchandise. The new duty went into effect twenty-four hours after it was passed. The Reciprocal Trade Agreement with Canada pledged Canada to eliminate the 3 per cent excise tax previously levied on imports and this pledge was carried out by the Canadian Parliament. The Trade Agreement, however, provided that a war emergency would justify the waiver of the provisions of the agreement. That the 10 per cent duty is justified by this provision is the basis for the Canadian action.

The agreement provides that the United States may take such action as may be necessary in case of depreciation of foreign currency. While Canada is substituting a 10 per cent duty for its pledge to eliminate the former 3 per cent excise tax, the United States has made no move to counteract the advantage given Canada through the 11 per cent depreciation of its currency.

The present situation, therefore, is that Americans selling in Canada are subject to a 10 per cent handicap; Canadian manufacturers selling in the United States are given an 11 per cent advantage over American manufacturers selling in the American market.

Rx FOR CURING A SHIPPING HEADACHE



Illustrating how simply rolls are prepared for the Acme Skid-Check Method.

CHAFING, caused by oscillation of the individual rolls, is giving many paper shippers severe headaches. But not those using the new *Acme Skid-Check Method.* This scientific and proven remedy eliminates chafing in transit —one of the principal sources of damage to paper shipments. We will be glad to give you full details about this new procedure. Just mail the coupon for the complete story of the application. It's the news the paper industry has been waiting to hear—write today.

ACME *Unit-Load* PROCESS REDUCES CARLOADING COSTS

Important savings are also being made by application of the Acme Unit-Load Process. This quick, simple and inexpensive bracing procedure eliminates unnecessary and costly bracing materials—reduces freight charges (less tare weight)—and lowers labor costs. In addition, every shipment of paper is "bound to get there"—the problems of the damaged shipment and resultant claims are eliminated. Customer goodwill is protected. Mail the coupon below for full details—you'll find many ways of effecting important savings in the Acme Unit-Load booklet.

ACME *Steelstrap* PROCESS SPEEDS UP SHIPMENTS

The many advantages of the Acme Steelstrap Process have made it invaluable in the shipping departments of many paper manufacturers. By safeguarding customer goodwill . . . saving time and material while providing adequate protection to individual skids, cases and rolls at minimum cost, the Acme Steelstrap Process effects important economies in handling and shipping. The illustrated booklet "Stopping Profit Leaks" will show what it can do for you.

Mail the coupon for your copy—no obligation.

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☐ Send full details on the Acme Skid-Check Method
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☐ Send a copy of "Stopping Profit Leaks Beyond the Production Line"

Name.....

Address.....

City.....*State*.....

Recent photograph of the new K-C wadding plant.

K-C WADDING PLANT NEARS COMPLETION

The huge, new, coarse wadding plant being constructed in Neenah, Wisconsin, by the Kimberly Clark Corporation is rapidly nearing completion. It is expected that the three-story building will be turned over to the corporation by the contractors, the Siesel Construction Company, early this month. The building is 235 feet long, 72 feet wide, and 70 feet high, and is quite revolutionary in design. Incorporated in the walls is 8,300 square feet of glass brick and inside there is 1,200 square feet of glazed tile. The roof is constructed of precast reinforced concrete slabs. The new mill which is attached to the west end of the Badger-Globe mill is air conditioned and has acoustically correct ceilings.

◆

CANADIAN OFFICES FOR PRICE & PIERCE

Price & Pierce, Ltd., agents for years for Eastern Canadian and British Columbia lumber for sale in the United Kingdom, has opened new offices in Montreal. Dr. John S. Bates, formerly with Price Brothers and Company, is in charge.

The firm has been acting as agents for a few Canadian pulp exporting companies over a term of years. The emergency in Europe has shut off a very large tonnage of all pulp grades from export markets and has thrown on Canada the responsibility of supplying all possible pulp grades and tonnages for the urgent needs of the United Kingdom. The Price and Pierce organization has been actively engaged in helping this new movement and has opened a Canadian office to facilitate direct contacts with suppliers. It is believed that the shipment of pulp from Canada to the United Kingdom represents a permanent trend and for that reason the company is planning to maintain this new Canadian office not only for the duration of the war but for the future.

◆

BOOTH ORDERS HYDRAPULPER

J. R. Booth, Ltd., Ottawa, Ontario, has ordered a second Fleck-Cowles Hydrapulper for pulping down lapped stock for the No. 2 machine. When installed, this will mean that Nos. 1 and 2 paper machines will be running and producing various grades of paper, including kraft, butcher's wrap, sulphite sheets and bonds; all stocks being prepared without the use of beaters. The company reports an increase in capacity on No. 1 machine since the installation of the first Hydrapulper.

◆

SUTHERLAND FINANCING PLANS ARE DROPPED

Dropping its plans to finance through a sale of additional common stock, Sutherland Paper Company, Kalamazoo, Michigan, has sold $1,000,000 of debentures maturing serially $100,000 a year over the next ten years, at an average interest cost of 2.77 per cent. The company has decided to withdraw its application to the SEC to register 43,050 shares of common stock, proposed to sell at $22 a share.

ORDER ABITIBI PROPERTIES SOLD

Following the judgment of Justice Middleton on June 10 ordering the sale of the assets of the Abitibi Power and Paper Company, Ltd., advertisements have appeared in leading newspapers recently setting forth the terms of the sale and the properties to be disposed of. Sale of these properties will take place on October 16 and will be free of encumbrance save for a reserve bid to be fixed by the Master of Chancery of the Ontario Supreme Court.

◆

CONSOLIDATED MAY REOPEN QUEBEC MILL

The Consolidated Paper Corporation, Ltd., is considering reopening its Cap de la Madeleine mill at Three Rivers, Quebec, a report from Canada stated recently. The mill, which has a rated capacity of about 260 tons of newsprint per day, has not been in operation for a number of years and would involve a substantial outlay of about $1,000,000. According to reports, should the corporation decide to reopen the mill it would concentrate on the modernization and improvement of three of the existing four machines to a point where the production of the three when renovated would be the same as that formerly of the four.

◆

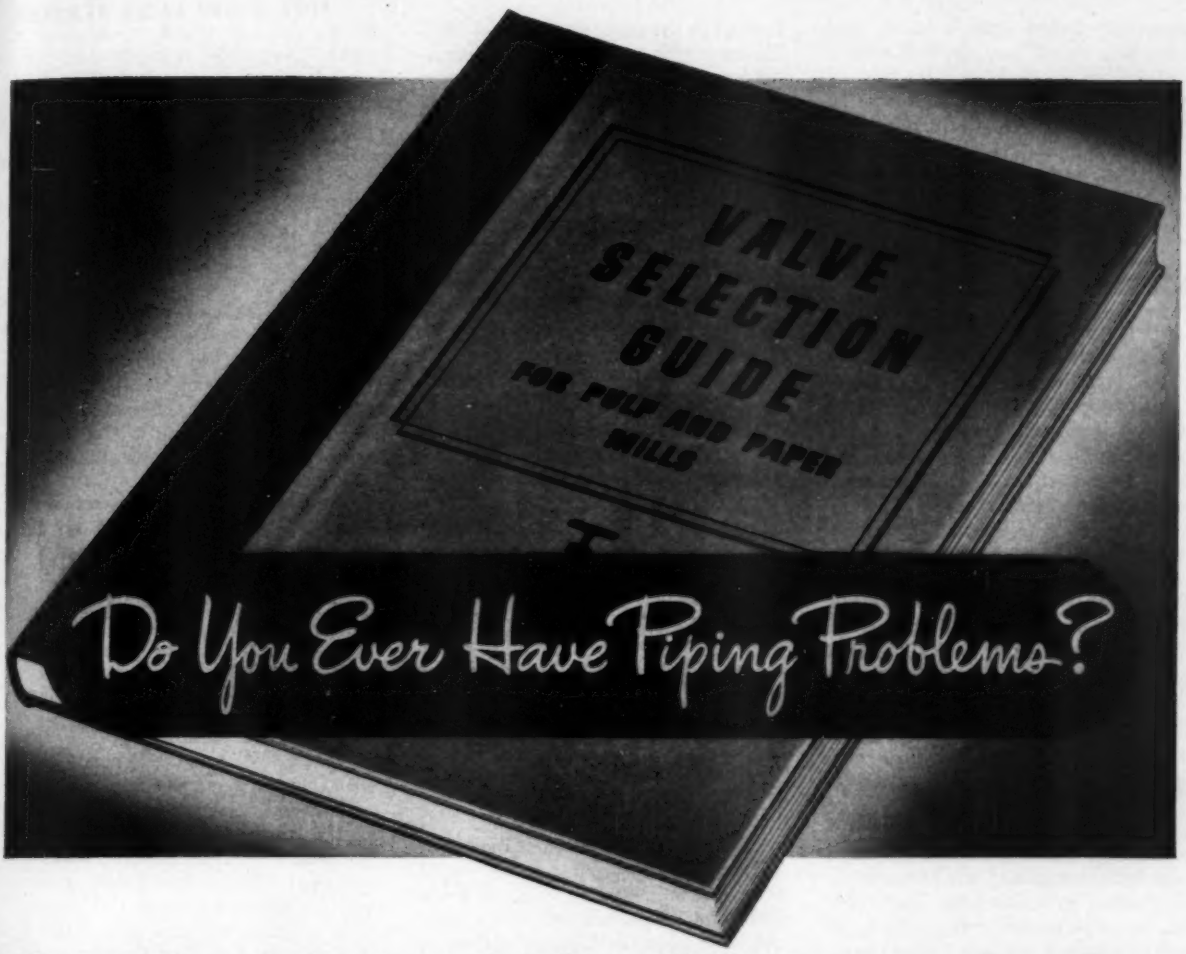
HOWARD SMITH IMPROVEMENTS

A construction program, now practically complete, has been in progress at the Crabtree Mills division of Howard Smith Paper Mills. The finishing and shipping section of the plant has been extended into a three-story building and attractive new office quarters have been installed. Additions are also being made to the machine shop and boiler plant, the latter being improved by the installation of a new 478-b. hp. B and W water-tube boiler. The appearance of the property has also been improved by the building of a retaining wall and a terraced lawn.

◆

NEWSPRINT PRICES ARE UNCHANGED

The price of newsprint will remain unchanged for another six months, International Paper Company having announced a $50 price, based on New York delivery, through the first quarter of 1941. Other companies will un-



This Valve Selection Guide will help you solve them

YOU'LL find it the most handy valve book ever printed. Simply turn to the section that deals with any process of pulp and paper making and there you have sound recommendations of the valve best suited for the service required.

This guide covers every step of pulp and paper manufacture where liquids or gases must be controlled—and power plant piping as well. It lists over 1,000 valve items used in modern pulp and paper mill pipe lines.

Backing up the recommendations in this Valve Selection Guide, are the world's greatest line of valves; the long experience and successful background of Crane in solving flow control problems in every industry.

IT'S FREE!

JUST MAIL THE COUPON TODAY

Send for your copy of this Valve Guide today—it's free! It will show you the way to important economies throughout your piping system. Use the coupon below.

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I want a copy of the Crane Valve Selection Guide for Pulp and Paper Mills. No obligation, of course.

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Title.....

Company.....

Street.....

City..... State.....

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

doubtedly follow this position, and some have already announced that there will be no price advance for the six month period. This action is part of the paper industry's determination to hold prices to a reasonable basis, and not to take advantage of any price flurries that might develop through speculative buying during the war period.

◆

EXPORT OF CAN. FOREST PRODUCTS SHOWS INCREASE

Exports of Canadian forest products continued to increase in July and at some $35,300,000 reached the year's highest level, the gain over a year ago being fully 71.2 per cent. Of the total amount, newsprint accounted for $15,200,000 against $8,500,000 a year ago; pulpwood $2,100,000 against $2,200,000; wood pulp $6,700,000 against $2,300,000 and planks and boards $6,600,000 against $4,300,000. Of the total exports of forest products for the seven months of this year ($184,360,000) shipments to the United States accounted for $116,644,000.

◆

DEVELOPMENT AT MINAS BASIN

Due to a new power development now being completed, the Minas Basin Pulp and Power Company, Hantsport, N. S., expects to have a supply of power adequate for any future expansion of the plant as well as for expansion of the groundwood mill completed early this year. By contract between the Nova Scotia Power Commission and the company, a power development is being completed at the head of Margaret's Lake where the waters of the Ingraham River have been diverted into Panuke Lake. This development is expected to provide 35 million kilowatt hours a year. A second power development in the Paradise River mill will add about 3,750 horsepower.

The company has contracted with individual operators for logging and portable milling operations in long lumber for the British market on the company's timber holdings. The total woodland holdings of the company exceeds 150,000 acres.

◆

APPROVE M AND O REORGANIZATION

The reorganization plan of the Minnesota and Ontario Paper Company has been approved, according to a news report. The plan had been previously approved by the bondholders' committee and principal creditors and conformed to the conclusions of the SEC. Under the plan Series A, B, C, bondholders will receive $500 principal amount of new 5 per cent bonds and 40 shares of new common stock for each $1,000 of old bonds held, while Series A holders will also receive $7.50 in cash and Series C holders $5 in cash. All unsecured creditors will receive 30 shares of the new common for each $1,000 of claims.

Federal District Judge Norbye at Minneapolis declared the plan fair, equitable and feasible and found that it complied with the National Bankruptcy Act and with provisions of the Chandler Act that were applicable.

BRIEFS

▶▶▶ UNITED WALL PAPER FACTORIES, INC., Chicago, reported recently that its earnings in the fiscal year ended June 30 were the best for any year since 1930. Net income amounted to $320,265.

◆

▶▶▶ THE MANNER IN WHICH PRICES of kraft paper abroad rose after the European war became acute is shown by a foreign value of $3.50 per hundred pounds for M. G. kraft paper shipped in October last from Sweden to Galveston. This foreign value established by the Customs Court was about one cent a pound higher than the rate prevailing before the German attack on Poland.

◆

▶▶▶ THE NEW FOURTH STORY ADDITION TO the Riverside Paper Company mill at Appleton, Wisconsin, is practically completed. It is constructed of tile, concrete and steel. The space, which will largely be used for paper stock storage, is 78 feet wide and 88 feet long, and cost $13,500.

◆

▶▶▶ RAYONIER, INC., has prepaid $500,000 of its bank loans to reduce its bank debt to $6,000,000, a news report stated. The prepayment represents a loan installment normally due August 1, 1941.

◆

▶▶▶ NAMES OF A NUMBER OF FIRMS formerly identified with the pulp and paper industry in British Columbia have now been removed from the Provincial Companies' register in that province by the registrar in the course of his annual purge of the list and the weeding out of defunct firms. Companies removed and thus officially declared to be dissolved include the Vancouver Kraft Company, Ltd. It was announced that unless just cause is shown within two months, the names of Davis Pulp and Paper Company, Ltd., and Appleford Paper Products, Ltd., will also be removed from the list.

◆

▶▶▶ THE ONTARIO PAPER COMPANY recently presented the St. Catherine's Flying Club with a "Cub 65" training ship for war pilot training purposes. The presentation was made by A. A. Schmon, president and general manager of the company.

◆

▶▶▶ WOOD CUTTING OPERATIONS in Canada for the 1940-41 season have started and present indications point to an absolutely capacity cut. This year's cut should show about a 25 per cent increase over last year, it was said.

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▶▶▶ WORK ON THE NEW Chicago plant of the Fort Wayne Corrugated Paper Company is progressing rapidly and it is expected that the unit will be ready for occupancy by about September 15. The one-story building, to contain 66,000 square feet of floor space, will employ about 150 persons. The building occupies a site 300 by 235 feet in Chicago's Central Manufacturing District.

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▶▶▶ THE TEXAS PLANT of the Container Corporation of America at Fort Worth is now completed. The plant has facilities for making both folding cartons and corrugated shipping containers. Manufacturing and sales are under the direction of J. R. Neil.

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▶▶▶ ERECTION OF A SECOND GROUP of twenty dwellings has now been undertaken by the British Columbia Pulp and Paper Company. The twenty new employees' homes will be erected at the company's townsite at Port Alice, B. C., and will cost about $50,000.

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▶▶▶ BUILDING CONTRACTS for two plant additions to provide for current expansion in manufacturing activities have been placed by the Dixie-Vortex Company, manufacturers of paper cups and containers. One addition is to be erected at the Chicago plant the other at the Easton (Pennsylvania) unit.

EDITORIAL

Creating the Paper Market

▶▶▶ THIS IS THE FIRST of September, almost three months since France capitulated to the Germans.

Immediately following that event, the Germans predicted the annihilation of England by August. Yet August has come and gone, and England still stands. It is well to keep these facts in mind for they have had a profound effect upon the American markets,—particularly, the paper market.

With the fall of France in June, the consumers of commodities in this country went into a confused state and quit buying, and said:

"If we buy now, we are liable to annex a war baby in the shape of an inventory of war-priced stock on which we will take a loss before the war will be over. So, we won't buy."

Thus, for two and a half months now, intensive hand-to-mouth and continuous depletion of inventories has been the order of the days while they watched for the Blitzkrieg.

Meanwhile, every day the German war machine has been using little and big Blitz's great gun bombing from coastal France and daily, vicious propaganda to "soften" England for invasion. But, England has given Germany a Roland for each Oliver and during all this time, has become stronger and sturdier on defense until today, it is the prediction of men whose business it is to carefully chart and determine the trend of the conflict, that the present war will probably continue over the winter. Then what?

The British blockade of all Europe will continue. That means, no pulp or paper imports from Scandinavia. Also, the-adequate-defense-of-America program started last May, is getting into its military stride. Orders for every type of supplies are placed every week. Industry and commerce already are reflecting the upward impulse. The third quarter of this year will witness the high point of business activity and volume since 1929.

The waning of the fear of the fall of England and the rapid expansion of the domestic preparedness program are certain to change the present listless commodity demand into an active endeavor to build up stocks abnormally depleted. For business men who geared their purchases of paper to the belief that Germany would speedily defeat England, have finally wearied of waiting for Hitler to make good and already have begun to place some replacement orders.

What will happen is what always happens in these psychic markets, viz.: the buyers always stay out of the market together and then, when they have overstayed, they all come into the market together with a rush.

Fire Prevention Week

▶▶▶ IT IS ESPECIALLY FITTING that the week of October 6 to 12 is to be observed throughout the United States as Fire Prevention Week, for during this week the twenty-ninth annual congress of the National Safety Council will be held in Chicago. Special recognition of this week will be observed in many large industrial organizations and it is not too soon to mark the time on your calendar and to make arrangements to join this nation-wide movement.

The need for preventing fires is indisputable. It is so easy to be careless; and fires can start from the simplest of causes. Maybe a stray spark results in a big pulpwood fire; or spontaneous combustion may start a fire in the waste paper warehouse, old rags in storage, or a straw pile. Such fires can be very spectacular, but losses can be equally awe-inspiring.

Equally simple are numerous other causes of fires that are disastrous, such as an employee who steals a smoke in an unfrequented spot around the mill. Carelessly throwing away a match, cigarette or cigar he may start a fire that will result in heavy property losses. No mill can be too strict about enforcing rules to regulate safe practice on this point.

Then, too, there is the hazard of neglected electrical equipment and of other machinery. Fires may start from hot bearings, from dirty motors, from defective insulation on extension cords, from oily rags thrown carelessly around, from sparks of welding or cutting torch operations, from overfused electric circuits, and ever from lighted electric light bulbs left in contact with combustible materials.

Good housekeeping is essential if fire hazards are to be minimized. There should be a place for everything; and everything should be in its place. Likewise, the mill should be kept clean. Orderliness and cleanliness are effective weapons in overcoming the fire menace.

Every employee should be instructed to take no chances with fire, in other words, to view each hazard as would a fire inspector and to report any unsafe condition before fire starts. Most assuredly in such instances "an ounce of prevention is worth a pound of cure."

Get Ready for Winter

▶▶▶ PROCRASTINATION seems to be one of the human traits that is common to most individuals. It is so easy to put off until tomorrow what should have been done today. Then, the first thing we know, it is too late, and that which we had planned to do, can be done only with difficulty or cannot be done at all.

So it is in putting the mill property in shape for winter. When the weather is nice, it is so easy to delay the fixing of a leaky roof; to put off repairing broken windows, or to neglect the hole in the mill yard that was a quagmire all last spring; putting every piece of machinery that must operate out-of-doors in A-1 condition, protecting all water mains and steam lines against the ravages of winter, or perfecting the ventilating system in the grinder room, wet room, beater room, or machine room that acted up last winter and gave plenty of trouble with fog and drip but which straightened itself out with the coming of spring.

The open season offers so many opportunities to get these things done as well as to do many other things.

In only a few short weeks, winter will be closing in on mills in the North. If your mill is in this territory, are you satisfied that everything has been done to put it in shape to function as efficiently as possible under lower temperatures and storm conditions that are bound to arise? If your house is in order, no more need be said; if not, take the hint and govern your actions accordingly.

ADVERTISING PAGES REMOVED

Current Thought

THE LAND NOBODY WANTED

WILLIAM SIBLEY

▸▸▸ BACK IN 1783 England wanted the international boundary line between the United States and Canada fixed at the Ohio River. Benjamin Franklin, John Adams, and John Jay, as representatives of the newly formed United States of America wanted no such thing. Rather, in recognition of the valuable riparian rights, they desired that the international boundary line be traced by the Great Lakes, from Niagara Falls to the end of Lake Superior. The controversy over this point lasted several weeks, but, from the result, we see that Franklin and his associates won their point and saved for the United States not only the whole of Lake Michigan but all that territory that now comprises Ohio, Michigan, Indiana and Illinois. The last of the English posts in this territory was surrendered in July, 1796.

Subsequently, New England encouraged her hardiest young men and women to settle the frontier country by offering free homestead lands. The generous land offers made at that time resulted in the territory being so rapidly settled that in January, 1805, Congress established what was then known as the Territory of Michigan, the name being derived from the lake that formed its western boundary. Came then the War of 1812; a devastating period in many ways but one that, through the surrender of Detroit, brought this whole region into prominence before the entire country. Additional thousands, attracted by the rich, fertile soil and the vast quantities of hardwood timber and pine, speedily took their frontier abode in this section. This migration not only continued but steadily grew in volume (materially aided by the opening of the Erie Canal in 1825) until in the single year of 1836 more than 4,000,000 acres of Government land were purchased by settlers.

In 1834, the incoming homeseekers had so increased the population that the territorial government appropriated a smal sum of money with which to take a census. This census surprised nearly everyone by revealing far more than sufficient population to authorize the formation of a state under the provisions of the Ordinance of 1787. Accordingly, a convention was held in May, 1835, at which time a state constitution was adopted and formal request for a charter made to Congress.

The Congress of 1836 was just as unhurried as the Congress of 1940, and this lack of speed delayed the issuance of the charter until January of 1837. However, this seemingly unnecessary delay was not entirely due to the slothfulness of Congress. Rather it was due to the unique situation of two sovereign states quarreling over a boundary line. Ohio wanted the line fixed where it now stands while Michigan sought to push it southward some 75 miles, thus adding to her already rich territory. By congressional action this dispute was settled by Michigan yielding compulsorily the question of the boundary and accepting as compensation the northern peninsula that jutted northwest from upper Wisconsin and overhung the maior peninsula of Michigan. Being totally ignorant of the vast copper and iron deposits in the northern peninsula, this settlement was not at all satisfactory to the citizens of Michigan. They did not want the northern peninsula and did not hesitate to say so in clearly understandable terms. Editorial and speech comment of the day was most bitter in denunciation of the forced arrangement and one Detroit pulpiteer took as a text for a sermon: "The Folly of Franklin and Its Recent Imposition."

It was not until ten years later that the great iron and copper deposits were rediscovered. Even at that time their extent was not fully appreciated, so that the real development of the state did not start until about 1850. Since that time, however, more than 4,500,000 tons of copper has been extracted with geological surveys showing that an even greater amount yet remains. This is enough copper to girdle the earth with a strip of pure metal 10-gauge in thickness and 10 feet in width.

Such vast quantities of native ore and timber easily attracted the Eastern industrialists—and with the result we now see. Interesting it is to know, however, that the territory which to a great degree has made possible our industrial expansion was originally a land that nobody wanted.

Bleaching Dyed Paper

E. R. LAUGHLIN and H. A. LIPS

E. I. du Pont de Nemours & Company, Inc.

AUTHOR'S NOTE: The subject relates to the bleaching of colored broke, and the study is intended to provide an answer to the question "To what extent will a simple, feasible bleaching treatment destroy any dyestuff likely to be used in the beater dyeing of paper?" Papers individually dyed with 85 colors representing acid, basic, direct, sulphur, and miscellaneous pigment classes, were bleached with one per cent available chlorine as calcium hypochlorite for periods up to one hour in duration. The results were computed spectrophotometrically and are tabulated together with any necessary comments. Approximately 40 per cent of the colors studied may be considered readily bleachable.

▸▸▸ THE EFFICIENT UTILIZATION of the broke produced during a run of colored paper is a problem frequently encountered. This is particularly true in mills making colored specialties or in instances where the shortness of a run prevents the immediate re-use of more than a very small fraction of the colored trim, off-shade or off-weight paper produced. Likewise, the decision to cull a questionable set of a colored run made during the night may not be reached until the following morning when the change-over to white or another color already has taken place.

The often followed practice of letting the broke accumulate until the next run of black has many disadvantages, not only because the anticipated order of black may not be forthcoming, but also because adequate storage space may not be available.

Furthermore, the non-uniformity of colored broke may make its re-use in runs of similar hue doubly difficult for the beater engineer in his attempt to make proper compensation by altering the color formula. A bad guess in this respect may result in two tons of new broke from the attempted consumption of 500 lb. of old.

Lastly, the danger of a graniting effect is ever present as well as the possibility of incompletely repulped clusters of fibers which are all the more conspicuous because they are colored.

All of these facts have led many mills to give serious consideration to the removal of color by bleaching. But the colossal dearth of any specific information on the bleachability of the hundred-odd paper coloring materials has unduly hampered this development.

The present study is intended to provide an answer to the question,

Table 1—Bleachability of Paper Dyed with Basic Dyestuffs

No.		Lb. of Dyestuff in Original Std.	Lb. of Dyestuff in Repulped Sheet	Per Cent Loss on Repulping	15 min. Bleach		30 min. Bleach		60 min. Bleach		Effect on Shade
					Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	
	Basic Yellow:										
1	Auramine Conc.	3.00	0.84	72.0	0.08	90.5	0.06	92.9	0.05	94.0	color destroyed
	Basic Oranges:										
2	*Chrysoidine R	6.00	1.90	68.3	0.10	89.5	0.19	90.0	0.18	90.5	color destroyed
3	*Chrysoidine GN	6.00	1.46	75.6	0.08	94.5	0.06	95.9	0.05	96.6	color destroyed
	Basic Browns:										
4	Basic Brown BR	2.67	1.90	28.8	0.15	92.1	0.10	94.7	0.06	96.8	color destroyed
5	Basic Brown GXP	2.90	1.60	45.0	0.10	93.7	0.05	96.9	0.04	97.5	color destroyed
	Basic Reds:										
6	Rhodamine 6GDN Extra	2.20	1.26	42.8	0.68	46.0	0.53	56.4	0.45	64.3	no change
7	Rhodamine B	11.20	5.16	53.9	2.25	56.4	1.80	65.0	1.63	68.4	no change
8	Fuchsine Conc. Powder	0.67	0.31	54.0	0.03	90.0	0.01	95.2	0.01	96.7	color destroyed
9	Safranine T Extra	3.45	2.10	39.0	0.15	92.9	0.10	93.2	0.05	97.4	color destroyed
	Basic Violets:										
10	Ethyl Violet	0.53	0.40	24.5	0.16	60.0	0.12	70.0	0.10	73.0	no change
11	Methyl Violet NE	0.59	0.40	32.2	0.28	30.0	0.09	77.5	0.06	83.0	no change
12	Paper Blue R Conc.	0.68	0.50	27.2	0.13	75.0	0.09	81.0	0.06	88.0	no change
	Basic Blues:										
13	Victoria Pure Blue BO	0.58	0.43	26.6	0.22	48.0	0.16	62.5	0.15	65.0	no change
14	Victoria Blue BX	0.97	0.72	25.8	0.26	64.0	0.20	72.2	0.17	76.4	no change
15	Methylene Blue ZX	1.38	0.86	37.7	0.12	86.0	0.05	94.2	0.03	96.5	destroyed
	Basic Greens:										
16	Brilliant Green Crystals	0.82	0.55	32.1	0.24	75.0	0.09	83.6	0.07	87.3	destroyed
17	Victoria Green Small Crystals	0.92	0.54	41.3	0.07	87.0	0.04	92.6	0.02	96.3	destroyed

Table 2—Bleachability of Paper Dyed with Acid Dyestuffs

No.		Lb. of Dyestuff in Original Sol.	Lb. of Dyestuff in Repulped Sheet	Per Cent Loss on Repulping	15 min. Bleach		30 min. Bleach		60 min. Bleach		Effect on Shade
					Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	
	Acid Yellows:										
18	Metanil Yellow Conc.	5.08	2.40	52.7	0.64	73.3	0.52	78.4	0.47	80.4	no change
19	Quinoline Yellow Conc.	11.00	1.80	76.7	0.05	98.3	0.02	99.4	0.008	99.8	destroyed
	Acid Oranges:										
20	Orange RO.	1.77	1.63	40.4	0.32	68.5	0.46	72.1	0.45	72.2	no change
21	Orange II Conc.	3.65	2.01	45.0	0.53	72.6	0.48	76.4	0.40	79.8	no change
	Acid Reds:										
22	Crocein Scarlet N Extra	7.83	2.63	70.4	0.35	64.0	0.83	68.0	0.73	71.7	no change
23	Fast Red AS.	7.00	3.52	49.6	0.35	73.0	0.68	80.6	0.63	81.0	no change
24	Ruby PL Conc.	9.00	7.08	21.4	0.51	91.7	0.33	95.3	0.22	96.9	destroyed
25	Brilliant Crocein FL.	7.30	5.50	24.8	0.12	97.8	0.08	98.5	0.05	99.1	destroyed
	Acid Violets:										
26	Violet C4B.	2.05	1.10	46.3	0.21	81.3	0.16	85.4	0.12	89.1	destroyed
27	Violet S4B.	1.66	0.88	47.0	0.09	90.4	0.07	92.0	0.05	94.3	destroyed
	Acid Blues:										
28	Soluble Blue R.	2.20	1.26	40.0	0.08	93.5	0.06	95.2	0.05	96.0	destroyed
29	*Anthraquinone Blue B	8.50	7.20	16.5	0.18	97.5	0.14	98.2	0.12	98.4	destroyed
30	Fast Blue R.	2.75	2.08	24.5	0.12	94.2	0.07	96.6	0.02	99.0	destroyed
	Acid Green:										
31	*Green BL Conc.	4.26	2.45	42.6	0.17	93.0	0.13	93.0	0.07	97.0	destroyed
	Acid Blacks:										
32	Blue Black SX.	3.08	1.65	46.3	0.20	87.9	0.17	87.7	0.10	93.9	destroyed
33	Nigrosine WSB Powder	6.53	3.26	51.7	0.17	94.8	0.14	95.5	0.09	97.3	destroyed

Table 3—Bleachability of Paper Dyed with Direct Dyestuffs

No.		Lb. of Dyestuff in Original Sol.	Lb. of Dyestuff in Repulped Sheet	Per Cent Loss on Repulping	15 min. Bleach		30 min. Bleach		60 min. Bleach		Effect on Shade
					Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	
	Direct Yellows:										
34	Fast Yellow NNL.	9.50	6.30	28.0	6.20	1.6	6.05	3.9	6.05	3.9	no change
35	Fast Yellow BBL.	13.20	7.80	41.3	7.10	9.0	7.00	10.2	6.95	10.8	no change
36	Fast Yellow 4GL.	9.80	6.10	37.7	1.5	75.4	1.40	77.0	0.90	85.2	destroyed
37	Fast Yellow L2RX.	11.00	8.80	20.0	5.90	32.8	5.10	42.0	4.80	45.5	no change
38	Yellow CH Conc.	3.23	1.94	38.0	1.68	13.9	1.66	14.5	1.57	19.0	no change
39	Yellow SXP.	3.52	3.50	00.5	1.86	46.8	1.73	50.5	1.72	50.8	no change
40	Yellow SXR.	5.20	3.95	24.0	2.65	32.8	2.64	33.0	2.30	41.8	no change
41	Yellow SXG.	9.50	6.60	30.6	2.65	59.8	2.50	62.1	2.35	64.4	no change
42	Stilbene Yellow G Conc.	5.08	4.80	5.5	3.03	37.0	2.85	40.6	2.65	44.8	no change
43	Brilliant Paper Yellow Conc.	3.00	2.20	26.8	0.17	92.3	0.14	93.6	0.12	94.6	destroyed
44	*Quinoline Yellow P Extra	10.00	4.78	52.2	0.06	98.8	0.04	99.2	0.04	99.2	destroyed
	Direct Oranges:										
45	Fast Orange MRL.	3.00	1.85	38.3	1.54	16.7	1.51	18.5	1.49	19.5	no change
46	Fast Orange EGL.	3.03	2.66	12.2	2.00	24.8	1.93	27.4	1.93	27.4	no change
47	Fast Orange WS.	3.06	2.33	24.0	0.80	65.6	0.45	80.7	0.44	81.8	no change
48	Orange R Conc.	4.90	3.03	38.0	0.66	78.2	0.46	84.8	0.25	91.0	yellow
	Direct Browns:										
49	Fast Brown SKRL.	3.17	2.53	19.5	1.66	35.0	1.48	42.0	1.18	53.7	no change
50	Brown CR.	2.38	1.80	24.5	0.42	73.3	0.36	80.0	0.32	81.2	yellower
51	Brown D3GN.	2.97	1.77	40.4	0.37	79.1	0.24	86.4	0.21	88.2	yellower
52	Brown N3G.	5.60	3.73	33.0	0.63	83.2	0.50	86.7	0.40	89.3	yellower
	Direct Reds:										
53	Fast Scarlet 8BSN.	5.44	3.52	35.0	2.10	40.0	1.76	50.0	1.32	62.4	no change
54	Fast Scarlet 4BA.	4.53	2.70	40.4	1.10	59.0	0.86	68.0	0.80	70.0	no change
55	Fast Scarlet 4BS.	2.87	2.00	30.2	0.72	64.0	0.56	72.0	0.37	81.5	no change
56	Fast Rubine B Conc.	1.60	1.00	37.5	0.72	29.0	0.42	58.0	0.26	74.0	no change
57	Fast Pink EBN.	4.43	3.33	25.0	1.70	49.0	1.43	57.0	0.92	72.4	no change
58	Fast Pink BL.	5.40	3.90	27.7	0.13	96.6	0.05	98.7	0.03	99.3	destroyed
59	Fast Red 8BL.	2.67	1.70	36.0	0.40	76.5	0.33	80.6	0.27	84.1	no change
60	Red 12B Conc.	4.93	3.50	29.0	2.16	67.0	0.73	79.6	0.41	88.5	no change
61	Purpurine 4B Conc.	5.08	3.62	28.1	1.00	72.5	0.50	86.2	0.23	93.7	yellower
62	Congo Red.	2.76	2.10	24.0	0.50	76.0	0.33	84.3	0.13	93.8	yellower
	Direct Violets:										
63	Brilliant Violet B.	3.97	2.75	30.6	1.62	42.0	1.32	52.0	1.1	60.0	no change
64	Fast Heliotrope B.	3.26	2.40	26.2	1.05	56.2	0.77	68.0	0.58	75.8	no change
65	Violet N.	2.78	1.87	32.6	0.27	85.5	0.22	88.8	0.15	92.0	yellower
	Direct Blues:										
66	Fast Blue 4GL.	6.69	4.22	39.3	1.96	52.4	1.22	72.8	0.84	79.6	changed to blue gray
67	Fast Blue RRL.	3.70	2.30	38.0	0.90	61.0	0.55	76.0	0.42	81.7	redder
68	Fast Blue SFL.	3.72	2.33	37.5	0.52	77.7	0.33	86.0	0.22	90.6	redder
69	Fast Turquoise 8GL.	5.80	3.64	37.3	1.53	58.0	1.00	72.5	0.8	78.0	no change
70	Blue AX.	3.30	2.20	33.2	0.62	71.8	0.44	80.0	0.26	88.0	redder
71	Blue BBN.	8.0	7.16	10.5	0.32	95.5	0.20	97.2	0.08	98.9	destroyed
72	Deep Blue BH Conc.	3.80	3.25	14.5	0.22	93.2	0.16	95.1	0.10	96.9	destroyed
73	Sky Blue 6BX.	3.0	2.87	37.5	0.20	89.2	0.10	94.6	0.03	98.4	destroyed
74	*Sky Blue 6BX dyed with copper sulphate	4.90	3.66	25.4	0.30	91.8	0.20	94.5	0.13	96.5	redder
	Direct Greens:										
75	Green GX.	3.86	2.82	32.8	0.33	82.0	0.26	91.2	0.22	93.4	green destroyed shade duller
76	Green BX.	3.23	2.43	22.2	0.24	90.2	0.23	90.6	0.17	97.0	green destroyed shade duller
	Direct Blacks:										
77	Fiber Black N.	4.26	2.5	40.0	0.28	88.8	0.27	93.2	0.23	94.8	yellower
78	Black E.	5.62	3.76	33.2	0.34	92.0	0.22	94.2	0.26	95.8	yellower

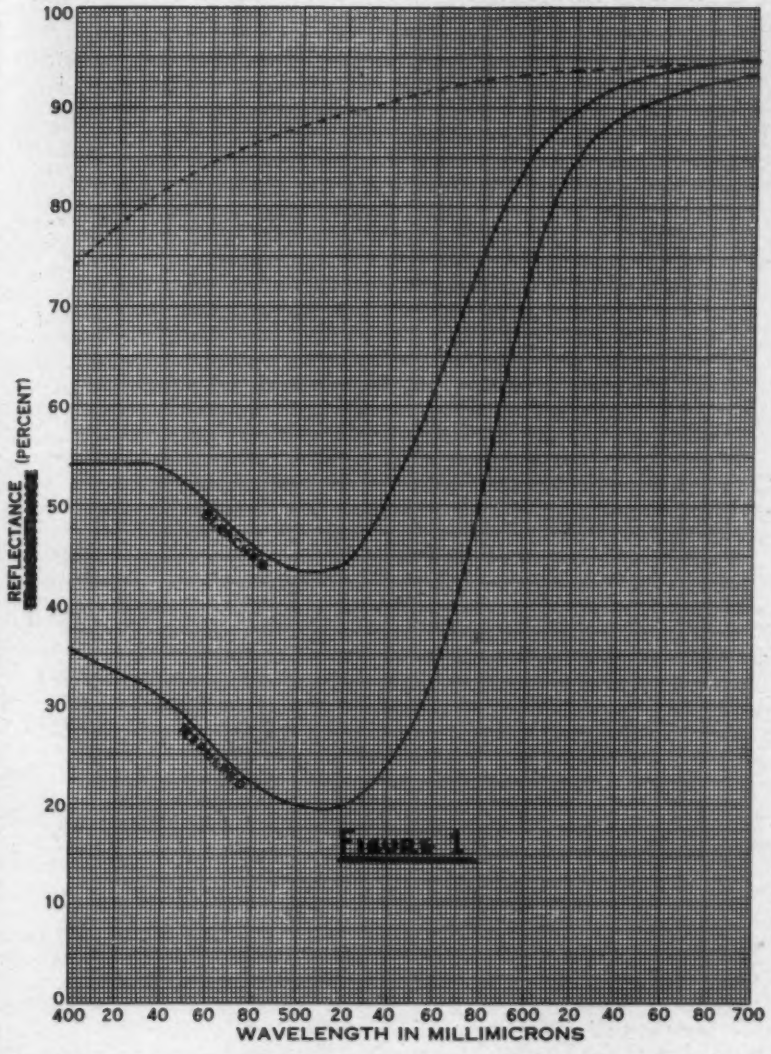


FIGURE 1

"To what extent will a simple, feasible bleaching treatment destroy any dyestuff likely to be used in the beater dyeing of paper?"

While it is recognized that the use requirements of the finished paper, special fastness properties as well as considerations of economy, have resulted in the selection of a particular color formula, it is nevertheless frequently possible to substitute readily bleachable colors with reasonable efficiency for those in use where, of course, the requirements of the finished sheet do not include fastness to chlorine or ink eradicators. This study, therefore, may serve as a basis for revamping color formulas on grades where the consumption of colored broke presents difficulty.

Sixteen acid colors, 17 basic colors, 45 direct colors, one sulphur color and 6 miscellaneous pigments—a total of 85—were selected for quantitative evaluation of bleachability.

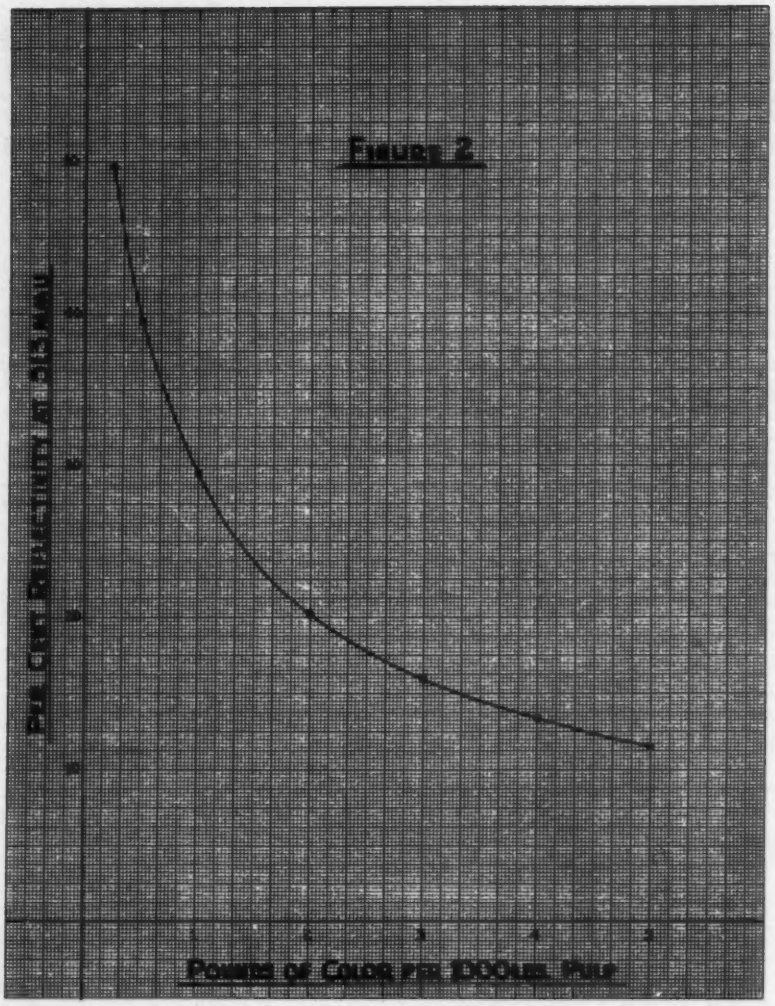
Several problems were encountered in the development of a suitable experimental procedure and their solution necessitated a number of preliminary tests. For obvious reasons, sized paper made by applying the various colors individually to a bleached pulp was the starting point. However, it was necessary to study the variables of time, temperature, *p*H and bleach concentration on a few selected colors known to possess widely varying degrees of bleachability in order to develop a method consistent with standard bleaching practice and to avoid those conditions known to promote excessive cellulosic degradation.

A survey of the recent literature on bleaching by Jackson and Parsons (*1*) indicates unanimity of agreement on the fact that only at *p*H values above 8.0 is all active chlorine present as the hypochlorite ion; also that greatest degradation of the cellulose occurs in the proximity of *p*H 7.0. Previous observations by the same author (*2*) indicated the least degradation occurred within the *p*H range of 8 to 11. Hisey and Koon in an earlier work (*3*) found that 1 per cent soda solubility was greatest when the bleaching was carried out at neutrality, but decreased at increasing *p*H values beyond this point until at 8.6 it was equal to that of the unbleached pulp.

Since the optimum conditions from the standpoint of degradation were quite effective in destroying the colors known to be readily bleachable, the following bleaching procedure was adopted: One per cent (on the weight of the pulp) available chlorine as calcium hypochlorite at a controlled *p*H of 8.0 to 8.5 and a temperature of 110 deg. Fahr. The time of bleaching was varied: 15 minutes, 30 minutes and 1 hour. A pulp consistency of 3 per cent was the highest that could

Table 4—Bleachability of Paper Dyed with Sulphur Colors and Miscellaneous Pigments

No.		Lb. of Dyestuff in Original Sol.	Lb. of Dyestuff in Repulped Sheet	Per Cent Loss on Repulping	15 min. Bleach		30 min. Bleach		60 min. Bleach		Effect on Shade
					Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	Lb. of Dye Remaining	Per Cent Color Destroyed	
	Sulphur Colors:										
79	*Sulphogene Carbon MCF Grains	11.5	7.80	32.2	4.08	47.7	3.90	50.0	3.80	51.2	no change
	Miscellaneous Pigments:										
	Organic:										
80	Lithosol Yellow HV 20% Paste	40.0	31.50	21.2	23.80	24.5	23.40	25.7	22.6	28.2	no change
81	Lithosol Fast Green B Powder	20.70	11.70	43.4	10.00	24.4	9.70	27.2	9.20	22.3	no change
82	*Halopont Brilliant Blue 2RN	30.00	18.50	38.4	13.40	27.5	11.20	34.0	11.30	38.8	no change
	Inorganic:										
83	Chrome Yellow	60.00	44.00	26.8	32.00	27.2	31.20	29.2	31.20	29.2	no change
84	Paper Blue S (Prussian Blue)	5.24	3.64	30.6	3.44	5.5	3.44	5.5	3.44	5.5	no change
	Natural:										
85	*Sap Brown	30.00	19.6	60.8	13.00	33.6	11.20	37.6	10.80	44.8	no change



be conveniently handled with the 10 gram samples.

This procedure is quite similar to the final step in many multiple stage bleaching processes, where, after the initial chlorination, alkali extraction, and hypochlorite treatment, the bleach is finished off with a low density, mild hypochlorite treatment at higher temperatures.

The next problem confronted was the quantitative evaluation of the bleached pulp for color destruction. This was accomplished with the aid of the spectrophotometer.

Equation (*1*) is the derived form of the Kubelka-Munk equation relating the ratio of absorption coefficient K to scattering coefficient S in terms of the monochromatic reflectivity, R_∞.

$$K/S = \frac{(1-R_\infty)^2}{2R_\infty}$$

While it is true that in light tints the ratio K/S as determined for the dye alone is approximately proportional to the dye concentration, Foote (*4*) has shown that this is not true in light to medium shades but has indicated that log K/S when plotted against log concentration of dye on the fiber gives a straight line. However, the preliminary work demonstrated that this was only true in dye concentrations up through those producing a medium shade on the paper, and could not be relied upon in medium-deep or full shades.

It was necessary, therefore, to select other means. It was found when the reflectance values at the wave length of maximum absorption of the dye was plotted against dye concentrations in a series of standards prepared using the same dye, and covering the range required, that the strength of an unknown dyeing of the same dyestuff within this range could be accurately predicted from the curve.

The last problem to solve before beginning actual bleaching tests was how to account for the dye which might be loosened in the pulping of the dyed paper and subsequently lost in sheet formation after bleaching. For example, consider the case of a 5 lb. dyeing of a dyestuff known to be absolutely fast to bleaching. It is conceivable that in the pulping of this dyeing prior to bleaching, a portion of the color might be mechanically loosened. The bleach liquor would have no influence on the color but mechanically loosened portions would be lost in sheet formation. The spectrophotometric calculation of residual color might be, for example, 3 lb. It would obviously be erroneous to conclude that the color was 40 per cent destroyed by the bleach.

This barrier was circumnavigated as follows: In each case 50 grams of bleached sulphite pulp were colored with the dye to be investigated. The dyed pulp was divided into five portions and five thick handsheets formed and dried. One of these was put aside temporarily as the "original standard." The other four sheets were repulped individually on a high speed agitator, again formed into sheets and pressed, but only one was dried. This was termed the "repulped standard" and while it contained an unknown quantity of color (which could readily be determined on the spectrophotometer) it did contain the same amount of color as the other three sheets which were already repulped and ready for the 15 minutes, 30 minutes, and one hour bleaches.

A series of standards of known dye concentration was then prepared which varied in color depth from lighter than the one hour bleach up to the depth of the original standard. The number of standards necessary depended upon the destruction of the color by bleach but was generally 5 to 8.

Complete reflectance curves of the repulped standard and the one hour bleach were run on the General Electric Recording Spectrophotometer, and the wave length of maximum absorption noted. The reflectivity of the other sheets was then read at this wave length and the values of the standards plotted against dye concentration. From this curve the concentrations of the repulped standard and the three bleaches could readily be determined and the percentage destruction by bleach liquor calculated.

It was interesting to note during this preliminary work that the concentration of dye had very little influence on the results. In other words, with 1 per cent available chlorine as calcium hypochlorite, the percentage of color destroyed was virtually the same whether a 1 lb., 5 lb. or 10 lb. dyeing had been used originally. Therefore, medium strength dyeings were selected as a starting basis and enough color used to produce a dyeing of medium depth.

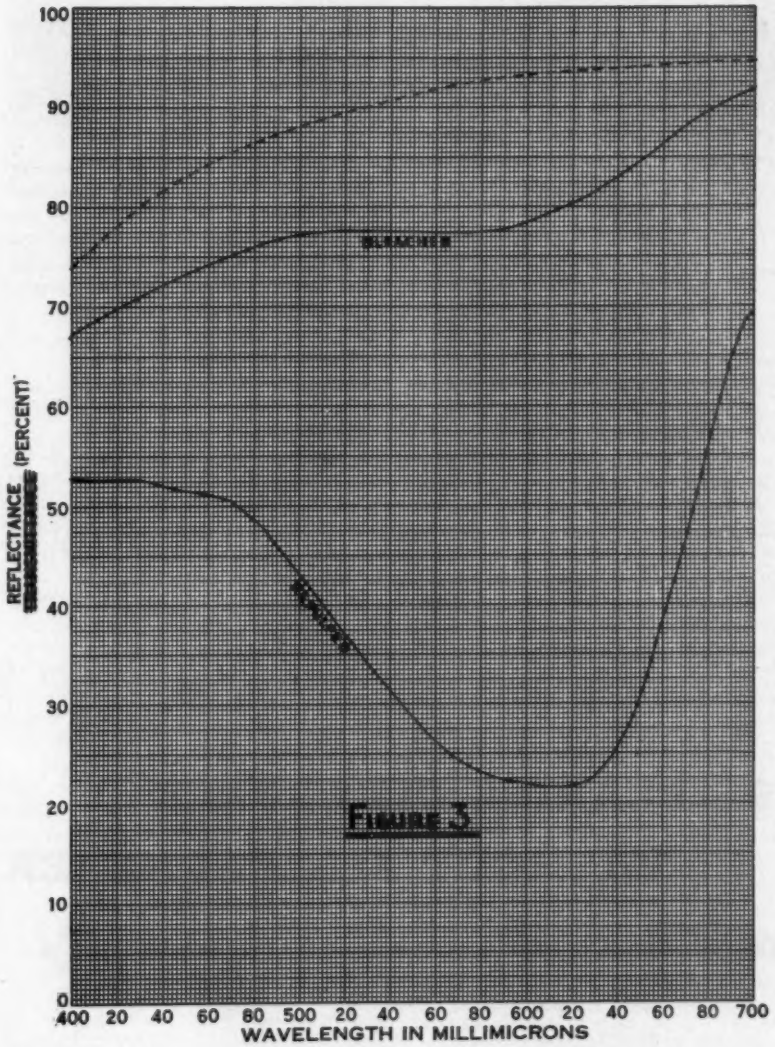


FIGURE 3.

It was also noted that increasing or decreasing the concentration of bleach resulted in an increase or decrease in the percentage color destruction execpt in those cases where the dyes were either exceptionally fast or exceptionally fugitive to chlorine.

The bleaching was carried out on the 85 colors and evaluations made in the manner just described.

Fast Scarlet 4BS serves as an excellent illustrative example of the method of computing color destruction. Figure 1 shows in the dotted line the reflectivity of the undyed bleached sulphite. The solid lines show the reflectivity of the repulped standard and the one hour bleach as indicated. It is apparent that the wave length of maximum absorption is in the proximity of 513 millimicrons. Figure 2 illustrates the relationship of the reflectivity of the standards at this wave length to the dye concentration in the series of standards which varied from 4 oz. of color to 5 lb. per 1000 lb. of pulp. It is from this curve that the dye concentration of the repulped standard and that remaining after the three bleaches was determined. In this particular instance a little over 80 per cent of the color was destroyed. While it is true that the reflectance curve of the bleached pulp is considerably removed from that of the undyed pulp, it must be remembered that only a very small quantity of color is necessary to cause a sizable decrease in reflectivity as is illustrated by more carefully examining Figure 2.

Figure 3 shows reflectance curves of sheets dyed with Pontamine Blue BBN before and after bleaching. The color in this case is 98.9 per cent destroyed.

The essential data are tabulated in the accompanying tables which show in addition to the color destruction during the three bleaches the color loss in repulping, and the influence of the bleach on the shade of the dyestuff in cases where only a partial destruction occurs. In several cases, an explanation is in order, and the numbers marked with an asterisk refer to the notes immediately following.

Explanatory Notes

*2 and *3—The Chrysoidines have extremely poor affinity for delignified fibers, and, consequently, are never used on fully bleached furnishes. This accounts for the high loss on repulping.

*29—The closely related type Anthraquinone Blue BN reacts similarly.

*31—The closely related type Green NV Conc. reacts essentially similarly.

*44—This color is hermaphroditic in the sense that it possesses some of the dyeing characteristics common to both acid and direct colors. While it is not strictly proper to classify it among the direct colors it is better than placing it among the acid dyestuffs.

*74—This color is frequently dyed with copper sulphate to improve light fastness. Apparently the copper exerts no significant influence on bleachability and the same may be assumed to hold true for No. 70, Blue AX, which is also sometimes dyed with copper.

*79—The other sulphur colors used for paper may be expected to react similarily. A higher bleach concentration will cause further destruction and as a class the sulphur colors may be considered bleachable.

*82—The other Halopont Blues and Violet react similarly. The exception is Halopont Pink 2B which is considerably more resistant to bleaching action.

*84—While this color is very fast to bleach it is readily destroyed by alkalis. Some mills effectively use caustic soda for bleaching broke dyed with Prussian Blue.

*85—The natural earth pigments (ochres, umbers and iron oxides) as well as Paris Black (Carbon Black) are essentially impervious to hypochlorite.

As a convenient reference Table 5 has been prepared in which the colors have been divided into four classes depending upon their ease of bleaching:

Class A lists those colors by number in which less than 30 per cent destruction resulted from the one hour bleach. These are termed fast to bleach.

Class B lists colors from 30 to 60 per cent destroyed. These are termed fairly fast to bleach.

Table 5

Class	A fast to bleach	B fairly fast to bleach	C poor bleach fastness	D readily bleachable
Basic			6 12 7 13 10 14 11 16	1 8 2 9 3 15 4 17 5
Acid			18 22 20 23 21 26	19 29 24 30 25 31 27 32 28 33
Direct	34 35 38 45 46	37 39 40 42 49	36 54 64 41 55 66 47 56 67 50 57 69 51 59 70 52 60 53 63	43 65 75 44 68 76 48 71 77 58 72 78 61 73 62 74
Pigment	80 81 83 84	79 82 85		

Class C lists colors from 60 to 90 per cent destroyed. These are termed of poor bleach fastness.

Class D lists colors from 90 to 100 per cent destroyed. These are termed readily bleachable.

The balance of the data requires little comment except to point out that in the majority of instances the 15-minute bleaching period destroys approximately 90 per cent of the color which will be destroyed if the time is extended to one hour.

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1) Jackson, D. T. and Parsons, J. L. *Tech. Ass'n Paper* XXII 370-6 (1939).
2) Jackson, D. T. and Parsons, J. L., *Tech. Ass'n Papers* XXI 326-9 (1938).
3) Hisey, W. O. and Koon, C. M., *Tech. Ass'n Papers* XIX 293-300 (1936).
4) Foote, W. J., *Tech. Ass'n Papers* XXII 397-404 (1939).

HOW TO MEASURE BEARING CLEARANCE WITHOUT A MICROMETER

W. F. SCHAPHORST, M. E.

▶▶▶ EVERY USER OF SHAFTING KNOWS that a loose shaft will "wiggle." The looser the shaft the greater the wiggle. In other words, the looser the shaft the greater the so-called "clearance."

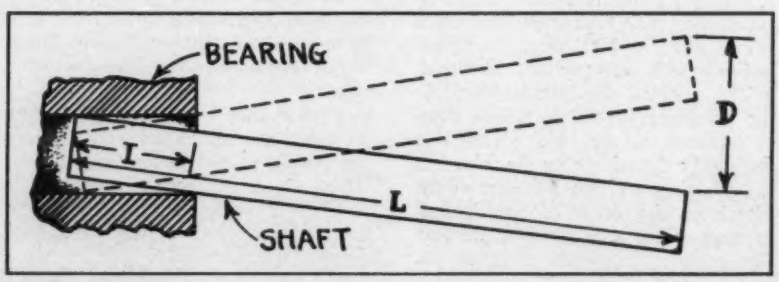
However, I dare say that very few users of shafts know that this wiggle characteristic may be utilized for determining the amount of clearance between the shaft and its bearing. And what is more it eliminates the necessity of a micrometer or fine hair-breadth measurements.

The sketch herewith shows how it is accomplished and the sketch also shows clearly "why" it is possible to measure clearance in this way.

Take the shaft out of the bearing and measure its length L in inches. Then shove it part way back into the bearing, distance *I*, which we will call "distance of insertion."

Now move the end of the shaft from extreme to extreme, the distance *D*, as shown in the sketch.

It is obvious that the distance *D* is directly proportional to the clearance. The greater the clearance the greater the distance *D*. If there is no clearance whatever the end of the shaft cannot be moved. To be sure if it is a long shaft it can be deflected owing to the elasticity of the shaft. This matter of deflection must of course be taken into consideration if the shaft is long. If the shaft is short and large in diameter deflection can be neglected.



After making all of the measurements suggested above and shown in the sketch, multiply the movement distance *D* in inches by the insertion distance *I* in inches and call the product "A." Then multiply the length of the shaft in inches by 2, and from the product subtract the insertion distance in inches calling the difference "B." Now divide "A" by "B." The result will be the clearance in inches.

For example, if D = ¼ inch; I = 1 inch; and L = 10 inches; application of the above rule tells us that the clearance between the shaft and bearing is 0.01316.

Admittedly, this sketch has been exaggerated purposely to show the principle behind the method of determining clearance.

It is obvious that this method is useful also for determining whether or not a bearing is out of round and if so, how much. This is accomplished by measuring the distance *D* in several directions.

Air Conditioning

Controls Paper Behavior

V. L. SHAW
Perfecting Service Corporation

▸▸▸ MOISTURE CONTROL AND PAPER BEHAVIOR, have long been a "bugaboo" to the men who have to answer for the complaints, adjustments and charge-backs, caused by the many pranks paper is apt to play 'twixt the mill and the printing press.

The Hopper Paper Company of Taylorville, Illinois, in its endeavor to combat this problem, has recently installed, and is now operating, a completely controlled, wide-range, year-around air conditioning system, which is a progressive step towards better control of paper behavior. This progressive step, in which Hopper is pioneering, should prove of interest to all makers and users of paper, as an aid to solving their paper problems, which may be due to the disturbing effects of temperature and moisture.

How to control the behavior of paper, and how to eliminate the familiar disturbances due to moisture and temperature, has been an important problem to all mills. In order to solve it, much research and experimentation has been carried on, with the result that some progress has been made. However, due to the many factors involved and to the many differences of opinion, there is still much to be learned before the problem can be narrowed down to a simple and practical formula for universal application. The problem is complex, due to the fact that all mills do not produce paper to a standard moisture content, and also due to the fact that plants of all users are not air-conditioned, while those that are air-conditioned, are not conditioned to the same temperature and humidity level. The geographical location of the different paper mills, converters, warehouses and printing plants, as well as the seasons of the year, have added to the problem of producing standardized papers for use under standardized conditions.

The study of this problem has brought out one important fact, and that is, that air conditioning is an important tool in controlling paper behavior. The part that air conditioning plays is to provide a scientifically controlled atmosphere of constant temperature and constant humidity, within which paper that is in balance with such an atmosphere can be practically and safely processed. How to use this important tool, air conditioning, to the best advantage, and what atmospheric condition is best suited to the controlling of paper behavior are questions of concern.

Many mills and printing plants have installed systems for air conditioning, and while air conditioning has been a benefit in establishing and maintaining conditions more suitable to average papers delivered, there is still so much paper outside of the average control range, that benefits derived may be considered small and the results as a whole disappointing.

Mills not content to accept the ever-recurring paper problems, due to "hit-or-miss" conditions, but wanting to take practical steps to produce paper suitable for printing under any atmospheric conditions, must consider all angles of the problem.

It is obvious, under present-day conditions, that one solution to this problem is, to work out a practical method whereby it will be possible to produce paper to meet, as near as possible, average conditions, and also to produce paper to meet the specific atmospheric conditions existing in different plants with which the paper is to be used. This logically, requires a general finishing room, conditioned to meet average paper demands; it also calls for a special finishing room, conditioned to produce specific papers. This special room should have wide-range control and capacity, that will make it possible to change from one condition to another quickly in order to provide for running successive orders to meet special moisture specifications.

The Hopper Paper Company, in considering air conditioning, decided to go all the way with two objectives in mind:

1) To be able to produce papers to be in harmony with any specified printing room.
2) To provide a production laboratory within which to learn what paper conditions will produce the most satisfactory performance in the printing plant.

With these objectives in view, the Company, in addition to its regular finishing room, constructed a new, special finishing room which was put

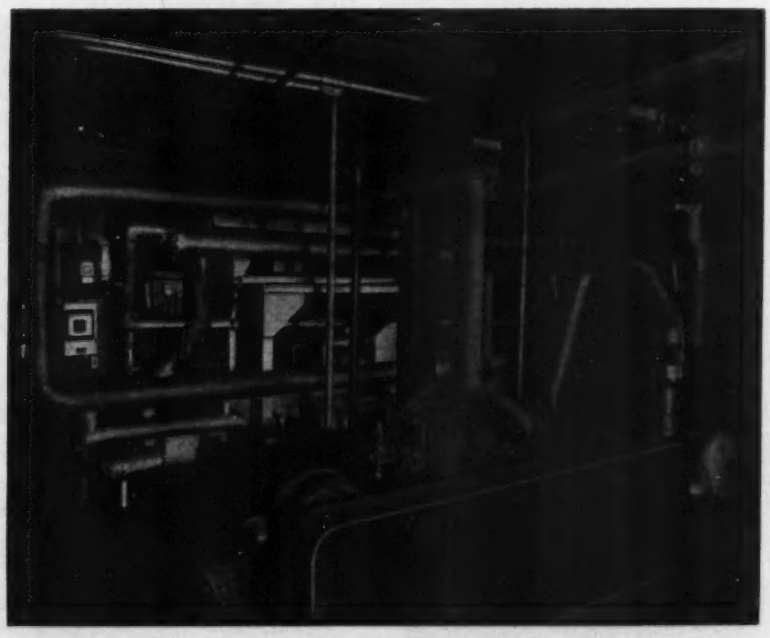
Special finishing room interior.

Conditioning equipment, showing fan, washer and duct work.

into operation in October, 1939.

Paper is delivered to this room from the paper machine with a closely controlled moisture content, and is cut, trimmed, inspected, and packed in a controlled atmosphere similar to the atmosphere in the printing room in which the paper is to be further processed.

The room, which is actually a complete "room within a room," is approximately 30 feet wide, 90 feet long and 10 feet high. The walls are of duplex construction, completely insulated, and have interior surfaces, moistureproofed, to reduce moisture lag. The ceiling also is insulated and moistureproofed. All overhead piping, including sprinklers, electrical conduits, etc., are installed above the ceiling proper, in order to prevent dust accumulation within the room, as well as for appearance. The illumination is of vapor-type, to insure minimum heat input. The room layout and the equipment within the room is so arranged as to provide efficient and straight-line handling of material. The rolls of paper from the machine enter the room through an opening in an end wall, which opening is closed by a heavy drop curtain.



Mechanical apparatus, consisting of duplex refrigeration machine, coolers, condenser and cold water storage.

Temperature and humidity within the room are controlled, both temperaturewise and humiditywise within close limits. All controls are operated from within the room, and any desired temperature and humidity may be established within a few minutes to accommodate change of orders. A recording thermostat and humidistat provide an accurate record, showing the condition under which any order was processed.

The air-conditioning equipment takes fresh air from out of doors into a humidifying and heating apparatus, and discharges conditioned air into the room through a supply duct system. The return air is taken from the four corners of the room at the floor, and is exhausted or recirculated, as may be required, into the humidifying unit.

The conditioning unit consists of an air washer, reheating coil and fan, located in an adjoining room. The humidifying unit is supplied with temperature controlled water, pumped from a cold water storage tank, which with the refrigerating equipment is located in an adjoining building.

The water to the conditioning unit is pumped directly from the storage tank, or recirculated as dictated by the room hygrostat. The temperature of the recirculated spray water is raised for high humidity operation by means of a steam ejector, also automatically controlled by the room hygrostat.

The refrigeration is accomplished by means of a duplex machine. This duplex machine operates in such a manner that one or both units automatically cut in and out, dependent upon the load.

The hygrostat on the control board in the finishing room, operates all controls, except the reheater of the humidifying unit, by means of a compressed air system. The thermostat within the room controls the temperature of the room at any desired setting, independent of the humidity requirements.

The Hopper Paper Company has taken a forward step toward solving the problem of paper control which should prove of lasting benefit to both the paper and printing industries. This step by Hopper should indicate to the printers that mills are willing to co-operate in every possible way to improve paper performance.

EDITOR'S NOTE: This system was designed by the Perfecting Service Corporation, Chicago, paper control engineers, and supervised by the author. The equipment was furnished by the Carrier Corporation, Syracuse, New York.

The pH Test for Paper

JESSIE E. MINOR and MARJORIE FARMER

▸▸▸ THE SUBJECT OF METHODS of testing papers for acidity and the interpretation of such tests in terms of paper permanence has been discussed in the literature so often that one hesitates to again approach the subject. However, as with other tests that are being used extensively by non-technical people, there is always the danger that changes in operation creep into the work which undermine the basic purpose of the test. Therefore, when any change in manipulation is proposed it is pertinent that the change be studied carefully as to its relation to the fundamental purpose of the test before it is too widely adopted.

In *The Journal of Research* of the National Bureau of Standards for May, 1939, (*1*) there was published a study of the *p*H test by H. F. Launier, in which it is recommended, on the basis of evidence given, that in making the test, the extraction be done at room temperature rather than at the usual boiling temperature. Since TAPPI is now considering the possible adoption of this recommendation, we feel led to offer our discussion of the underlying changes involved and their interpretation in terms of paper permanence. The arguments advanced may be briefly summarized as follows:

While cold extraction usually gives a higher *p*H than hot, the increase is not constant, averaging around 0.2 for high-grade, well-made papers and from 0.6 to 1.6 for poorly made, lower grade papers.

For papers of the same general type and character, the difference between cold and hot extract values will increase as the acidity of the hot extract increases. This means that the difference in *p*H of a poorly made paper and a well-made permanent paper is much less by cold extraction than by hot and the more adsorbed alum there is in the furnish or the more impermanently a paper is made, the greater will be the increase of the cold extraction over the hot.

For papers of different water repellent properties, the ratio will be erratic since hard-sized and heavy papers are not completely extracted in the cold in one hour.

The acidity which develops in papers from fiber degradation is of organic type and can have little direct influence on the *p*H of normal papers.

Any organic acidity which may come from sulphite cooking must be identical in kind with that from alum. Rag cooking is done in an alkaline medium. Any organic acid from bleaching is not stronger than that from alum, in the presence of the much larger amount available from the alum of the furnish, it cannot be considered as significant.

While a cold extraction may show, as claimed, the amount of alum acidity which is available for degradation at the particular moment of testing a hot extract is much more indicative of the amount which will become active under a measured amount of unfavorable conditions of heat, light or moisture.

The brittleness which develops in many papers on storage and which, in the early stages, is indicated by the loss of folding endurance, is probably very closely related to the adsorbed acid of alum which has been extracted by the paper moisture and is held in an active state close to the fibers.

Any heat encountered by a furnish, especially if moist, from that of a beater on a warm summer day to that of hot, moist paper storage space, will accelerate the slow changes of normal aging whereby the adsorbed and suppressed acidity of the excess alum of the furnish is made available for reaction and extraction.

The principal factors which control the *p*H of a paper extract are:

1) The amount of alum added in excess of that which is neutralized by the alkalinity of the furnish.

2) The amount and condition of the colloidal matter in the furnish which may serve as storage places for the adsorbed and suppressed acidity of the alum.

3) The life history of the paper after furnishing, especially the light and heat encountered.

4) The method of extraction for testing.

The arguments given by The Bureau of Standards for preferring to have the extract made at room temperature are as follows:

1) The manipulation is simpler.

2) When the Bureau added increasing amounts of alum to an all-rag beater furnish, using its semi-commercial equipment, the *p*H of the cold extracts, as well as those of hot extracts, gave a series of values approximately parallel to the amounts of alum added. For this series, for papers of which the hot *p*H was below 4.8, the increase due to cold extraction, with one exception, was 0.7; for papers of hot *p*H 4.8 to 5.0 inclusive, it was 0.6 and above *p*H of 5.0 the *p*H difference increased regularly to 0.3. With the alpha papers, of which the lowest hot *p*H was 4.9, the majority of the samples showed a difference of 0.3. However, a worn rag paper of commercial manufacture with starch sizing gave a difference of 0.9 at 4.9 for the hot extract, which is greater than Bureau-made paper of new rags without starch at hot *p*H 4.3.

3) The change of alpha content on oven aging, which the Bureau considers as reliable evidence of permanence, is shown to grade its series of papers in approximately the same order as does the *p*H of cold or hot extracts.

4) The lowering of the *p*H value by hot extraction is considered as evidence of a change in the hydrolysis of the alum which is abnormal to paper and which obscures the presence of other acids in smaller amounts which may result from cooking, bleaching or fiber degradation.

While it may be slightly easier to set the extraction at room temperature than to boil with return condenser or to a definite volume decrease, it would seem that the greater care needed to have *freshly* distilled water of a narrow *p*H limit would more than offset the task of maintaining the boiling temperature. This seems to be the *only* simplification which does not apply to the hot method as well as to the cold. The suggestions of non-filtration, glass electrode, etc., are now in general use for making hot extracts.

Browning and Ulm (*2*), working at The Institute of Paper Chemistry, compared the hot and cold extracts of three commercial bonds using glass electrodes and found for the one hour extractions as shown in Table 1.

Our own work also has shown that for many papers there is a much wider gradient between the two methods of extraction than was found by the Bureau. This has led us to the conclusion that the work of the Bureau was on a picked set of papers which were not sufficiently varied for the very broad generalization made therefrom.

Table 1

Paper Number	Furnish (per cent)	Surface Sizing	Extraction Time	*p*H of Cold Extraction	*p*H of Hot Extraction	Difference
1.	Sulphite, 100	Starch	1 hr.	6.13	4.69	1.44
2.	Sulphite, 100	Glue	1 hr.	6.32	5.19	1.13
3.	Rag, 50	Starch	1 hr.	6.84	6.12	0.72

This laboratory has always assumed that the retention of alpha content on oven aging did not show a true gradient except on paper of certain other definite relations and that there are many factors of impermanence which are not indicated by this test. Therefore, we hesitate to accept the apparent close relation found between *p*H of cold extract and alpha content retention as evidence for permanence for all types of papers.

An important point for this discussion is as to whether the excess acidity of a hot extract, as claimed, is due to an abnormal hydrolysis of the alum, or whether it could be merely a hastening of the slow changes which occur during the normal life of a paper. In other words, is hot extraction similar to oven aging in giving a preview of the slow changes of time upon these papers or is it abnormal? Before answering this question it is pertinent to review the normal changes which occur when alum, size and color are added to a beater furnish.

For our purpose we need to consider only the two processes of *adsorption* by which the particles in suspension are drawn by weak attractive forces to the surfaces of the fibers and other colloidal particles, and *chemical reaction* whereby a strong chemical bond is formed and the particles are strongly bound to the fiber or other surfaces.

If alum is added to pure water, a certain portion of the molecules will split into two parts, each of which will unite with parts of water molecules to give neutral alumina and sulphuric acid. Since these products come from the same molecules, they will be formed in a constant ratio to each other.

If alum is added to a beater furnish after the size, the alkalinity of the beater liquid will react with the acidity of the alum. If not enough alum is added to neutralize all of the original alkalinity, the alumina flocs will absorb the remaining alkaline ions and will assume a negative charge. In that state the alumina is worthless for binding size.

If just enough acid is supplied by the alum to neutralize all of the alkalinity of the water, the alumina will remain neutral and will be also worthless for sizing. This is at a *p*H of about 5.2 to 5.5.

If somewhat more alum is added than is required for neutrality, there will be left some free sulphuric acid which will be adsorbed by the alumina flocs. These flocs will then carry a positive charge and will be adsorbed by the fiber surfaces. But the bonding through acid ions is too weak to resist wire drainage and very little sizing results.

If sufficient alum is added so that the flocs have absorbed a certain minimum amount of acid, the acid begins to dissolve the flocs forming again aluminum sulphate. At this stage, positively charged aluminum ions appear to replace the neutral alumina flocs and the amount of this change will increase as more alum is added. With a large excess of alum there will be all aluminum ions and no alumina flocs. At any intermediate stage, the aluminum ions formed will be strongly adsorbed by the remaining alumina flocs, by the fiber surfaces and by any other negative colloidal surface present and will permanently bind the sizing and color to fibers by chemical reaction. For proper sizing we need a definite balance between the alumina flocs and the aluminum ions and this is regulated and indicated by the active acidity or *p*H of the liquid.

From the standpoint of paper permanence, the important point is that whenever enough alum is added to a beater to furnish sufficient aluminum ions for effective sizing and setting of color, every bit of negatively charged, colloidal matter in the furnish, including alumina flocs, beta cellulose, pentosans, degraded cellulose, starch, rosin, etc., is laden with adsorbed acid which may be said to be in a state of potential acidity inasmuch as it does not affect the surrounding liquid. Whether this acidity is held as incompletely dissociated alum molecules or as sulphuric acid from the hydrolized alum which has been adsorbed as such by the colloidal matter of the furnish is immaterial for this practical discussion.

Evidence that the releasing of adsorbed acidity of alum by heat is normal to paper life may be adduced from the well-known experience that the sizing of hard stock papers is more difficult on a warm summer day than in winter and that for identical furnishes the *p*H of the white water is more acidic on a hot summer day than in winter. This has been noted in beater furnishes which are above 5.0 of which the excess alum is quite small and must indicate that even in the beater slight warmth from the atmosphere will release more acidity than a cold winter day.

Further evidence that heat releases acidity of alum in paper is shown by data accumulated in this laboratory some time ago. In a nearby mill, at the end of a run of 50 per cent rag paper, excess alum was added to the chest. Data on tests of samples of this run are given in Table 2.

Apparently for the normal furnish there was very little alum acidity stored in the paper as shown by the relatively high *p*H and no fall of *p*H due to the heat of the dryer. When excess alum was added to the chest, there was neither time nor heat enough to give appreciable free acidity for the air-dried sample, but after passing over the hot dryers the effect of heat and alum is to lower the *p*H to 4.5 and increase the titratable acidity by about 16 per cent. After oven and light aging, the dryer effect is added to that of the artificial aging.

Evidence as to whether the normal aging of time on stored papers will cause an increase of active acidity by releasing of suppressed acid is given in data of Table 3. For this work we happened to have on hand two packs of high grade all-rag bond paper, each

Table 2

No.	Sample	*p*H Values			Titratable Acidity		
		As Rec'd	Oven Aged	Light Aged	As Rec'd	Oven Aged	Light Aged
	Normal Alum						
1.	Before dryer	4.9	4.3	4.0	.047%	.834%	1.510%
2.	After dryer	5.1	4.3	4.0	.042	.834	1.976
	Excess Alum						
3.	Before dryer	4.8	4.0	4.0	.067	.986	2.084
4.	After dryer	4.5	3.8	3.7	.078	1.040	2.133
5.	After tub	4.9	4.4	4.5	.125	1.143	1.998

containing 50 sheets, 8½ x 11, each having the edges sealed with tape to exclude air exchange and each having hung on the north wall of the laboratory for more than ten years. One of the packs was of a paper which was well sized with animal size. The other pack was of the same run of paper but it was taken from the machine before the tub. The outer sheet of each pack was of a deep brown color from light and air contact, the second sheet was slightly discolored, while the sheets farther in were of practically identical color which was probably not much different from the original color. From each pack the cover sheet and the sixth from the cover were chosen and tested for *p*H, for aluminum content and for sulphate content of the hot and cold extracts. The aluminum content was determined colorimetrically using Aurintricarboxylic acid. Copper number tests were also made to indicate the extent of the degradation of the cover sheets.

This data shows clearly that the outer degraded sheet of each pack gave to the extract very much more aluminum and more sulphate than did the better preserved inner sheet. It could be argued that excess sulphate content could be picked up from a laboratory atmosphere but the excess aluminum could have no other source than the effect of time upon the papers to make the combined aluminum more available for extraction and for reaction.

It is interesting to note that cold extraction of the outer sheet without tub sizing where penetration was probably relatively easy, gave the identical aluminum content as hot extraction though at a higher *p*H value. For the inner sheets and for the glue sized outer sheet, the one hour for cold extraction was undoubtedly incomplete.

Another practical experience applies at this point. Some years ago, when the specifications for minimum *p*H of paper began to appear, papermill technical men tried to predict the *p*H of the finished paper from that of the white water. In mills using relatively pure soft water and relatively pure hard rags, where there was a minimum of impurity and a minimum of colloidal surface in the furnish to hold acidity, there was found a close relation between the *p*H of the white water and that of the hot extract of the finished paper. In mills making lower grade papers from the white water test was found to be less satisfactory. One ingenious chemist, assuming that this difference was due to hydrolysis of the alum by the heat of the dryers showed *(3)* that for the papers of his mill, if the white water were boiled before making the test, results accorded reasonably well with those of the finished paper. The further study of that point in this laboratory *(4)* using various grades of paper showed that when wood papers of ordinary grade were subjected to a preliminary treatment simulating dryer heat, there was a fall of the *p*H of the hot extract due to such heat. But when well-made pure rag papers were thus treated, there was no fall of *p*H. Again we see that where there is much colloidal matter present as in the cheaper wood papers, and it is laden with adsorbed acid of alum, the heat of the dryers is sufficient to liberate a measurable amount, but when there is little stored acidity, the release is not appreciable.

This evidence that on every occasion of contacting moisture and heat, acidity from adsorbed alum is being given into the surrounding atmosphere and becoming more available for extraction and for the degradation of fibers leads strongly to the conclusion that hot extraction is merely another form of oven aging giving us an indication of acidity possibilities during a definite amount of natural aging and that the amount of it which occurs after forming the paper and before testing it may be indicated as clearly by the hot extraction as by the cold.

The question as to the extent to which organic acids of the degradation of fibers "which are extracted or formed during the hot extraction, contribute to the measure of *p*H" is raised by The Bureau. For evidence on this point we quote earlier work done in this laboratory in which twelve different papers were boiled in distilled water, cooled and titrated in the presence of the fibers using a CO_2 free equipment, and using suitable indicators to mark the end points of 5.0, 7.0 and 9.0. Results are given in Table 4.

In the average of these figures, less than five per cent of the titratable acidity was available for neutralization as long as the pH was kept below 5.0. The logical conclusion from this fact is that 95 per cent of the titratable acidity of these papers came from weak organic acids and that the acidity of fiber degradation can have no appreciable effect on a *p*H which is below 5.0 and for which impermanence is suspected.

The acid remnants of wood pulp cooking, if retained in the paper, could be no other than sulphuric acid identical with that of alum. Rags are cooked in an alkaline medium. The acid remnants of bleaching are not stronger than the acid of alum and, in the small amount possible in a finished paper, could not disturb the indications of the alum acidity. In the light of these facts it is difficult to see the reason for the statement of The Bureau that "hot extraction conceals

Table 3

Hot Extraction of Aged Papers

Tub Sizing	Pack Position	*p*H Value	Aluminum Content p p m	Sulphate Content p p m	Copper Number
None	Outer	3.9	2,240	33,120	7.462
	Inner	4.4	500	4,972	1.225
Glue	Outer	4.1	2,240	27,600	6.078
	Inner	4.2	500	8,280	0.939
Cold Extraction of Aged Papers					
None	Outer	4.6	2,240	27,600	
	Inner	5.0	280	4,140	
Glue	Outer	4.8	1,680	22,080	
	Inner	5.2	110	5,520	

Table 4

No.	Paper	Per cent Acid as H_2SO_4 at *p*H		
		5.0	7.0	9.0
1.	Book.....	.0034	.0892	.1029
2.	Book.....	none	.0152	.0196
3.	Book.....	.0039	.0534	.0837
4.	Book.....	none	.0176	.0196
5.	Writing...	.0072	.1373	.1373
6.	Manifold..	.0171	.1677	.2320
7.	Bond.....	.0053	.0863	.1127
8.	Deed.....	.0044	.0814	.0882
9.	Ledger....	none	.0201	.0343
10.	Index.....	.0039	.1657	.1882
11.	Writing...	.0024	.0657	.0688
12.	Newsprint.	none	.0250	.0343
	Average...	.0041	.0771	.0935

Table 5

	*p*H Values			Aluminum in p p m			Sulphate in p p m	
	Hot	Cold	Diff.	Hot	Cold	Diff.	Hot	Cold
Hard Sized Paper								
1st hr	5.4	5.4	none	56	28	28	690	414
2nd hr	5.17	5.7	0.53	64	22	42	207	69
3rd hr	5.6	5.63	0.03	14	none	14	166	none
4th hr	5.8	6.12	0.32	42	none	42	none	none
Soft Sized Paper								
1st hr	5.2	5.2	none	28	22.4	5.6	138	138
2nd hr	5.69	5.43	0.26	56	14	42	82.8	41.4
3rd hr	5.65	6.0	0.35	42	none	42	110.4	trace
4th hr	5.72	5.97	0.25	42	none	42	none	none

while cold extraction reveals the presence of acids other than alum."

It is quite probable that the best information as to the permanence to expect from a paper would be gained from making a hot and a cold extraction. If the *p*H of the hot extract is high and the difference is slight, it may be assumed that there is a relatively small amount of stored, suppressed acidity and that the chance of adverse conditions activating a larger amount than is present at the time is slight. On the other hand, if the difference is quite large, even though the hot *p*H is reasonably high, there is considerable danger that the paper will not resist adverse aging.

A high *p*H in a hard-sized paper is not always easy to attain and some manufacturers have resorted to the practice of adding a convenient amount of alum to the furnish, then compensating for the excess acidity by adding ammonium carbonate, sodium aluminate or other alkaline liquids at the head box. This short time of contact with the liquid gives a high *p*H to the extract and at the same time protects against loss of the sizing obtained by the high alum content. The reaction between adsorbed alum and very dilute alkali is necessarily slow and very little neutralization will occur before the paper reaches the dryers. The aging probabilities of such a paper leaves an open question as to whether the more interior position of the alum would allow it to act upon the fibers before it is neutralized by the alkali or whether the alkali does offer complete protection against acidity degradation such as the *p*H would indicate.

The only evidence we have on this subject is limited. On one group of papers made in a mill where we know that all chemicals are added in the beater we found for a starch-sized sulphite bond a difference between hot and cold *p*H of 0.4 and for some high grade bonds and index papers of that mill an average difference of 0.2. But similar papers made in a mill where it is the practice to add sodium aluminate before the wire showed a difference of 0.6 to 1.55 even when the hot *p*H was relatively high. Such evidence would throw grave doubt upon the protection offered by a high *p*H attained by adding alkali before the wire rather than by reducing the amount of alum added to the beater.

Before closing the work, it seemed of interest to ascertain as to how completely the one-hour boiling removed the adsorbed acidity of a paper. For this we chose various papers and made hot and cold extractions in the usual manner. Then, after decanting off the liquid for testing, the papers were again covered with distilled water of the required amount and extracted hot or cold for a second hour. The process was repeated for a third and fourth hour giving four extracts in each set. Each extract was tested for *p*H value, aluminum content and sulphate content, each test being on a separate portion of the extract. Results are given in Table 5.

The total amount of alum indicated in these newly-made papers contrasts very satisfactorily with that of the papers made ten years ago and reported in Table 3.

Apparently, even one hour is not always sufficient to extract the maximum of acidity or of aluminum from a hard sized paper for the second hot extract gave a lower *p*H than did the first. However, other papers tested did not show this and it is assumed that the one hour boil, as at present specified, should serve all practical purposes.

Literature Cited

1) H. F. Launer, National Bureau of Standards Research Paper 1205, May, 1939; also *Paper Trade Journal* 110, No. 10, TAPPI page 135, 1940.
2) B. L. Browning and R. W. K. Ulm, *Paper Trade Journal* 102, 89, (1936).
3) G. C. Chase, *Paper Trade Journal* 98, No. 22, TAPPI page 282, (1934).
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CONVENTIONS AND COMING EVENTS

Sept. 18—National Industrial Advertisers Association, National Conference of Industrial Advertising and Marketing Executives, Detroit, Michigan.

Sept. 19 — American Pulp and Paper Mill Superintendents Association, Michigan Division, Kalamazoo.

Sept. 20-21—American Pulp and Paper Mill Superintendents Association, Northeastern and Connecticut Valley Divisions, Joint Meeting, Poland Spring House, Poland Springs, Maine.

Sept. 23-25—National Paper Trade Ass'n, Stevens Hotel, Chicago.

Sept. 27-28—American Pulp and Paper Mill Superintendents Association, New York-Canadian Division, Lake Placid Club, Lake Placid, New York.

Sept. 28—American Pulp and Paper Mill Superintendents Association, Miami Valley Division, Elks Country Club, near Middletown, Ohio.

Oct. 2-5—Electrochemical Society, Fall Meeting, Ottawa, Canada.

Oct. 4-5—American Pulp and Paper Mill Superintendents Association, Fall Meeting, Pennsylvania-New Jersey-Delaware Division, Yorktown Hotel, York, Pennsylvania.

Oct. 7-11—National Safety Congress and Exposition, Stevens Hotel, Chicago.

Nov. 1-2—American Pulp and Paper Mill Superintendents Association, Southeastern and Southern Divisions, Savannah, Georgia.

Dec. 2-7—Fourteenth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City.

April 1-4—Eleventh Packaging Exposition and Conference, Stevens Hotel, Chicago.

PAPER SKETCHES

STORE
ONE GREAT BENEFIT ASCRIBED TO A PAPER MILL ESTABLISHED IN MARIN COUNTY, CALIFORNIA, IN THE 1850'S, WAS THAT IT "CLEARED OUT THE CAST-OFF GARMENTS, WHICH, FOR YEARS, HAD BEEN CLUTTERING UP THE STREETS OF SAN FRANCISCO!"
THE ANCESTORS OF WILLIAM RITTENHOUSE, AMERICA'S PIONEER PAPERMAKER HAD BEEN MAKING PAPER IN ANHEIM, ON THE RHINE, IN THE BATAVIAN PROVINCE OF GUELDENLAND FOR SEVERAL GENERATIONS!
A PROCESS FOR THE PRODUCTION OF PAPER THAT WILL WITHSTAND WASHING AND DISINFECTING AND THAT IS MORE DURABLE THAN PAPER NOW IN USE HAS BEEN ANNOUNCED BY AN ENGINEER AND INVENTOR FOR USE IN BRAILLE BOOKS FOR THE BLIND.
A WIDE SELECTION OF WALL PAPER WAS BEING SOLD IN NEW YORK BY GARRET NOEL, A BOOKSELLER, AS EARLY AS 1760!

ADVERTISING PAGES REMOVED

NOW *the Emphasis is on Fuel*

Drawn from scale model of Newcomen's Engine. Thru courtesy of The Franklin Institute.

Admiralty Coal · DEPENDABLE ANTHRACITE · DENDROID · CRITERION COAL · RODA · STONEGA · Old Kentucky · CROZER · PREMIX · GENCO

In NEWCOMEN'S day (1711) a steam engine that worked was the ultimate in accomplishment! Today power plants must work—and with maximum efficiency.

Modern equipment has been developed and refined to a point that in some plants the practical limit has been reached. In such plants and even in plants not so highly developed the sure road to greater operating efficiency is thru the scientific selection of the best fuel.

To assist in attaining maximum efficiency General Coal Company is admirably equipped. We have competent engineering personnel, abundant resources of coal in the principal producing districts and the experience built up thru years of serving large and small consumers in the nation's greatest consuming markets. Conveniently located offices bring the full resources of the General Coal Company within easy reach regardless of your location.

GENERAL COAL COMPANY
PHILADELPHIA

BOSTON · CHARLOTTE, N. C. · DETROIT · CINCINNATI · NEW YORK · CHARLESTON, S. C. · PITTSBURGH · BUFFALO

GENERAL COAL

Above is a fine aerial view of the University of Washington, where the technical sessions of the TAPPI meetings were held.

▶▶▶ FOR THE SECOND TIME, TAPPI invaded the Pacific Northwest when its members gathered for the fall meeting held in Seattle, Washington, August 13-16. Those who had come from the East to the Portland meeting in 1934 knew something of what was in store for them. To the others, much of it was new and of "colossal" interest. This is as it should be. Westerners go East to be knocked kicking by super-skyscrapers, or perhaps night clubs. Easterners come West to stand in awe and reverence beneath Douglas firs that sprouted four centuries ago. From the time the eastern, the southern and the middle west specials were brought together at Chicago and the trek began, until the "Home Sweet Home" dance on Friday night, there was a continuous program of activity for each of the 333 men and 96 women who were registered.

A good number of the national officers and committee men were in attendance. There were Ralph H. Hayward, vice president, and R. G. MacDonald, secretary-treasurer. From the executive committee there were Albert Bankus, L. C. Anderson, G. S. Brazeau and H. H. Harrison, who is also a past president of the Superintendents' Association and was the official representative of that group.

Of course, the officers of the Pacific Section were all on hand—N. W. Coster, chairman; F. A. Olmsted, vice chairman; Fred C. Shaneman, secretary-treasurer; Dr. H. V. Tartar and George H. McGregor, executive committee.

G. S. Brazeau, national executive committeeman, of the Pulp Division, Weyerhaeuser Timber Company, Everett, Washington, was the convention chairman. Upon him and N. W. Coster, Soundview Pulp Company, Everett, fell the brunt of making the general arrangements and seeing that they went through with almost clocklike precision. Their staff consisted of: Berk A. Bannan, Seattle, Arrangements; H. V. Tartar, Seattle, University Arrangements; M. B. Houston, Seattle and Fred Shaneman, Tacoma, Finance; W. R. Barber, Camas, Technical Program; Earl G. Thompson, Seattle, Registration; Leo S. Burdon, Everett, Woods Trip; William A. Geiger, Chicago, Transportation; H. A. Des Marais, San Francisco, and A. S. Quinn, Seattle, Reception; Ray Smythe, Portland, Ladies' Program; James T. Brinkley, Seattle, Entertainment; Lawrence K. Smith, Seattle, Publicity.

Convention activities proper centered at two points—registration and social affairs at the Olympic Hotel, which was the headquarters, and the technical sessions, the first two days, in Bagley Hall at the University of Washington. Chartered buses took the technical men from the hotel to the University each morning and brought them back at night, luncheon being provided each day at the University Commons, so that no time was lost.

As to the entertainment, which was provided the last two days, this was all over the Puget Sound area within a radius of a hundred miles, and more about that will be said later. The men got to play two days, while the ladies of the convention were busy sight seeing, tea-partying, fashion-showing, etc., most of the time. The big moment for the ladies, aside from the reception and banquet, was represented by the boat trip up the Sound on Thursday to Victoria, capital of British Columbia, and its famous Butchart's Gardens. A few, however, preferred the woods trip that day instead.

When TAPPIS work, they really *work*. In two days' time there were 31 formal papers presented, all exhibiting the most careful thought and preparation and almost all presented by the authors in person. In addition to

1—Bagley Hall, on the University campus, where the technical sessions were held, and some TAPPIS starting for lunch. . . . 2—Just hanging around the entrance of Bagley Hall waiting for the bell to ring. . . . 3—These gentlemen are progressing rapidly to lunch at the Commons. A shutter speed of one one-hundredth of a second scarcely "stopped" them. But as they shot by it was observed they were: (L to R) F. W. Brainerd, Scott Paper Company; N. W. Coster, Soundview Pulp Company; Roy L. Davis, Detroit Sulphite Pulp & Paper Company. . . . 4—Shall we say the "optimum" of good nature? Starting with the straw hat: Charles L. Bauer, Bauer Brothers Company; H. A. Vernet, A. E. Staley Manufacturing Company; N. M. Brisbois, Fibreboard Products, Inc.; T. C. Roberts and V. S. Denison, Beloit Iron Works. . . . 5—Now here is a case where you can do your own picking as the names are not in the same order as the faces. A score of 90 per cent (4½ faces) will be considered excellent. A. Ward Tedrow, Hawley Pulp & Paper Company; Francis W. Flynn, Crown Willamette Paper Company; R. D. Waddell, same company; John Bardsley, Powell River Company, Ltd.; P. J. McGuire, Oliver United Filters Company. . . . 6—Starting at the left—A. H. Lundberg, of A. H. Lundberg; Lewis S. Reid, Metropolitan Life Insurance Company (he doesn't sell life insurance, but does his company buy paper! Ten million pounds a year); C. E. Curran, Forest Products Laboratory; A. E. Boss, Columbia Alkali Corporation. . . . 7—College men, pulp men, and manufacturers' representatives chosen because of high diversity factor. From left: Martin Breuer, E. I. du Pont; R. B. Beal, Flox Company; V. L. Tipka, Hawley Pulp & Paper Company; Ivar Ekholm, National Analine Company; J. L. Beal, Montana State College. . . . 8—An old line goes: "So sweetly was their tongue speech fashioned that men trowed their every word." First speaker at left: Evald Anderson, Western Precipitation Company; H. W. Beecher, consulting engineer; C. W. Morden, Morden Machines Company; H. A. Vernet, A. E. Staley Manufacturing Company; O. T. DeFleux, chief power plant engineer, Crown Zellerbach Corporation.

Above—A sumptuous banquet was served in the Spanish Ballroom of the Olympic Hotel on Friday evening, followed by dancing. Left—At the speakers' table were: (L to R) G. S. Brazeau, convention chairman; Mrs. Brazeau; Dr. Charles Copeland Smith who made the principal address at the banquet; J. D. Zellerbach; and Vice President Hayward who is shown making a brief address.

these formal papers, there was a symposium by four speakers at the opening Tuesday, on the subject of Pacific Northwest forest resources.

Five subjects were also thrown open for general discussion at as many group dinners held Tuesday evening in adjoining private dining rooms at the Olympic. These subjects were: "Acid Pulping and Bleaching," under the leadership of W. Norman Kelly, manager Longview mill of the Pulp Division, Weyerhaeuser Timber Company; "Alkaline Pulping and Bleaching," Dr. Carl E. Curran, U. S. Forest Products Laboratory, Madison, Wisconsin; "Power," Henry W. Beecher, power plant engineer, Seattle group; "Applied Hydraulics," R. V. Bingham, president Bingham Pump Company, Portland; "Paper Machine Problems," R. S. Wertheimer, resident manager Longview Fibre Company, Longview, Washington.

In each of these group meetings there was an attendance of 50 to 100. After an excellent dinner, they all took off their coats and went to it. The informal discussions were led off by two or three men in each case, and ran on to midnight or after.

Mr. Wertheimer had a very good way of running his meeting and keeping the discussion from getting into too many channels. He had prepared a printed list of questions, 37 in number, pertinent to the subject. A copy was given to each one present, and attached to it was a ballot with seven spaces. In these spaces, the member set down seven of the question numbers showing his preference. These ballots were in before dinner was over, the results quickly tabulated. Thus it was possible to arrive at the seven questions of the most interest to the greatest number, and to keep most of the discussion on them.

Selection of the University as the meeting place for the technical sessions was a happy one. In the first place, there was every facility in Bagley Hall. The large auditorium, with its terraced seats, fine general and special lighting, facilities for presenting motion pictures and slides, and not forgetting its big

blackboard, where chemical formulas could be strung out to any length and where sketches could be drawn to illustrate points in the papers. All in all, the atmosphere was quite academic and not so bad for pulp and paper men to breathe once more.

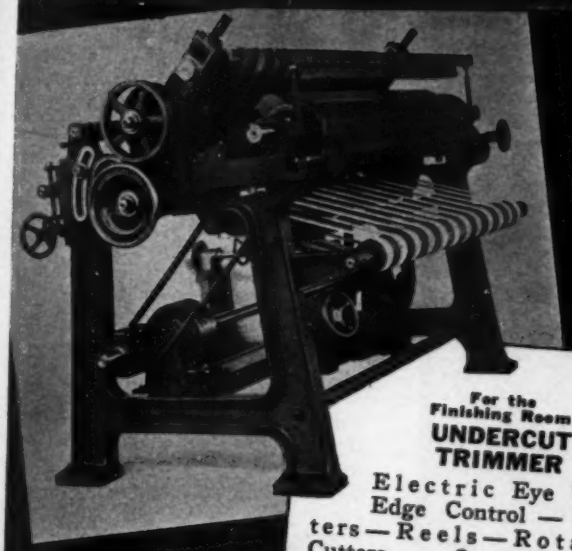
Then, too, the University, in its departments of forestry, chemistry and engineering, is very closely associated with the pulp and paper industry in Washington. Its staff contributed generously to these meetings. After N. W. Coster, chairman of the Pacific Section, had opened the session on Tuesday, Dr. Lee Paul Sieg, president of the University, made the address of welcome. B. L. Grondal, professor of forest products, W. L. Beuschlin, professor of chemical engineering, Arthur Walton and Milton A. Porter, department of chemistry, either delivered papers or introduced others on Tuesday.

Wednesday forenoon, which was devoted to the general subject of lignin, with nine papers, also saw the University men taking a prominent part, particularly since the lignin problem is still largely in the research stage. A. J. Bailey, acting director of

Group Dinner Meetings—Five of Them

1—At this group meeting the subject "Acid Pulping and Bleaching" was discussed. W. Norman Kelly, manager, Longview mill, Pulp Division, Weyerhaeuser Timber Company, was the group leader. . . . 2—Henry W. Beecher, consulting engineer, Seattle, led this meeting at which the subject "Power" was discussed. . . . 3—"Paper Machine Problems" was the subject at this meeting led by R. S. Wertheimer, resident manager, Longview Fibre Company. . . . 4—Randolph V. Bingham, president of the Bingham Pump Company, led this group meeting where "Applied Hydraulics" was discussed. . . . 5—"Alkaline Pulping and Bleaching," the subject at this group dinner was led by Dr. C. E. Curran, Chief of Pulp and Paper Section, U. S. Forest Products Laboratory.

SINCE 1828—FINER PAPER MILL MACHINES



PAPER MILL MACHINERY

Straight, Harper and Edwards Fourdriniers—For book, bond or fine tissues.

Cylinder and Wet Machines. Jordans — Pumps — Calenders "Rainstorm Shower Pipes".

●

Below: THREE PLUNGER STUFF PUMP

For the Finishing Room

UNDERCUT TRIMMER

Electric Eye Web Edge Control — Slitters — Reels — Rotary Cutters.

●

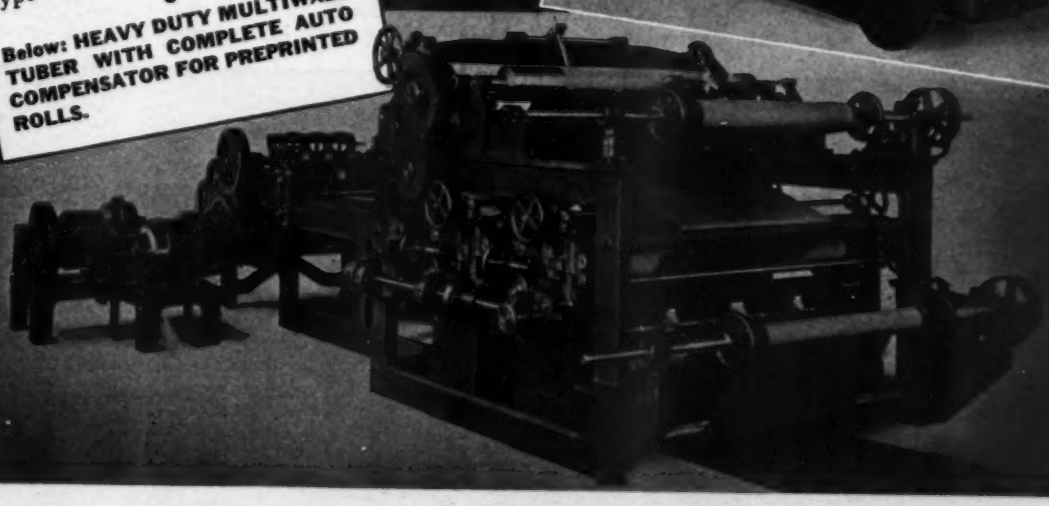
Above: Rotary SPOT CUTTER

FOR BAG PLANTS

Flat, square and satchell bottom bag machines—single and multiwall pasted valve bag machines — tuber and bottomer type bag conveyors.

●

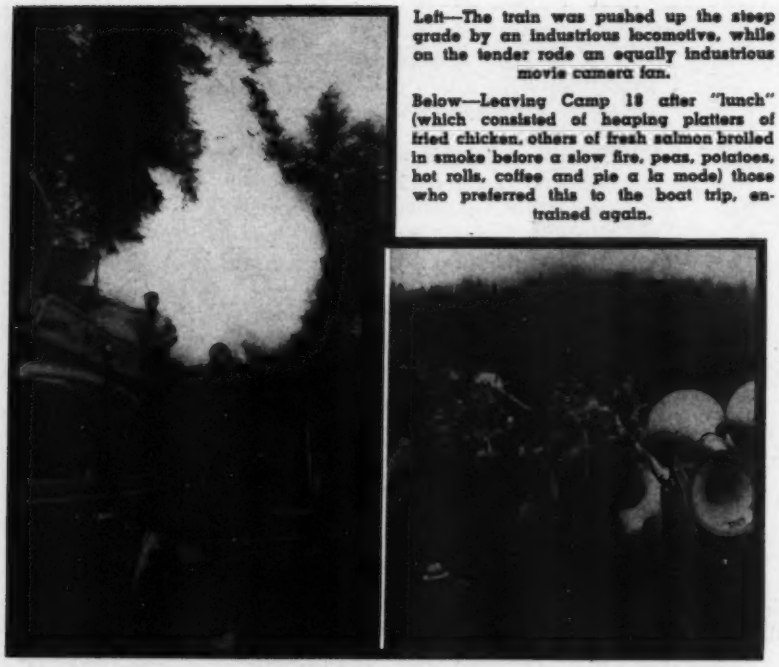
Below: HEAVY DUTY MULTIWALL TUBER WITH COMPLETE AUTO COMPENSATOR FOR PREPRINTED ROLLS.



The SMITH & WINCHESTER

Manufacturing 1828 *Company*

PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT



Left—The train was pushed up the steep grade by an industrious locomotive, while on the tender rode an equally industrious movie camera fan.

Below—Leaving Camp 18 after "lunch" (which consisted of heaping platters of fried chicken, others of fresh salmon broiled in smoke before a slow fire, peas, potatoes, hot rolls, coffee and pie a la mode) those who preferred this to the boat trip, entrained again.

lignin and cellulose research; H. K. Benson, professor of chemical engineering, and Irwin A. Pearl gave some interesting results of research in this field.

As Dr. Sieg pointed out, the University has established a small but active department for lignin research in the past year. Every effort is being made to find uses for this by-product of the pulp industry, which is now being wasted except for a very limited use as a binding material for road surfaces.

The 31 papers read at the sessions represent one of the most important and voluminous contributions to the industry that has appeared for a long time. The various subjects were treated so comprehensively and at such length that practically no time could be allotted to discussion in the meetings, which were run strictly on schedule.

Some especially interesting facts of a general nature were brought out, however, which may be briefly highlighted at this point. For example, Warren Tilton, forester, West Coast Lumbermen's Association, in the symposium on Northwest forest resources, stated that the stand of commercial timber in western Washington and Oregon, covers 14,000,000 acres, containing an estimated 600 billion board feet. This stupendous figure, translated into terms of paper pulp, represents 600 million tons. That this incredible amount cannot find a use solely as pulp products is evident from the standpoint of forestry. There is required a far greater diversity of stable markets.

But in spite of the great amount of timber here available, active steps are now being taken to combat waste. Forest fires, together with natural ripening and consequent death and decay are taking their toll. To allay this economic waste, fire prevention and fire fighting facilities, both governmental and private, are being increased. The complex subjects of selective logging and reforestation are being studied from every angle and steps are being taken to put the best methods into practical operation.

The papers by W. H. Price, forester of the Weyerhaeuser Timber Company, and E. P. Stamm, logging manager of the Crown Zellerbach Corporation (read by Forester Axel Branston), bore on these points. Where is the line to be drawn between minus and plus value logs in selective logging? What methods of selective logging are to be employed in one-story as against two-story forests? Some easterners found out for the first time that forests west of the Cascades grow more than one story high.

Right at this point, the whole subject becomes a very complex one from

Left—Up at Noosack Siding, party watched a skidder bringing logs down the mountain side to the loading point. They look small, but they are actually five to seven feet in diameter at the butt. . . . Right—"Come and get it!" This is just one of half a dozen huge tables in Soundview's modern and scrupulously sanitary mess hall at Camp 18. This is the TAPPI reach and stab gang, and were they hungry!

Shooting Pigment Problems Is Our Job

Given a chance, TITANOX pigments will do everything that may be required of them. But the makers of these better pigments don't stop at that. They seek to prove that TITANOX is the logical pigment for economically producing opacity, whiteness and brightness. And how can they prove it more convincingly than by helping paper manufacturers with their various pigment problems?

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We welcome all such problems. We are eager to solve them; for in the solution of each one the superior adaptability of TITANOX is demonstrated.

In the TITANOX Paper Service Laboratory, all paper and pigment problems are approached scientifically—in the light of newest information as developed in our Research Laboratories—not with the idea merely of relieving an individual situation, but rather with the purpose of applying the ever-growing fund of knowledge on which the leadership of TITANOX pigments is founded.

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Above — It rained that day up in the woods, but those without rain coats were provided with tarpaulins. Here, R. P. Hill, Pulp Bleaching Company, demonstrates how to wear one properly.

Below — After traveling by Greyhound nearly 100 miles, well over 100 people piled on this special logging road train. A sound truck on the forward car gave out sight-seeing announcements and provided music generously.

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the standpoint of economics. It looks simple to take out just those trees that are in their prime, and plant new ones as you go along. But when the elements of labor, equipment investment, transportation and other factors are taken into consideration, about the best that can be done now is to work toward the ideal as rapidly as possible, and still make enough profit to stay in business.

Manifestly, if the logging companies were compelled to practice purely selective logging, together with reforestation, as done in the older countries, and under present conditions were compelled to do it at a loss, soon there would be no more large scale logging operations. Then, the trees would go on ripening and dying, or being consumed by fires, and the waste would go on just the same, though in another form.

A lot of attention was paid to another paper, on the chemical side. It was that of J. F. White and G. P. Vincent, both of the research development department of the Mathieson Alkali Works, Inc. Many are of the opinion that America is one step farther along the road to complete independence of foreign products through the method they described of using sodium chlorite as a supplement to sodium hypochlorite as a pulp bleaching agent. Sodium chlorite oxidizes the coloring of the cellulose, but it is not so powerful as to damage the cellulose itself.

From the comments going around, B. W. Rowland's paper on the use of starch in papermaking was taken very seriously. Improvements in starch technology, and in the controls, seem to be making this subject of increasing importance.

As an order is not an order until the name is on the dotted line, so are paper products not of much use until they are sold, and stay sold for a specified purpose. So, though technical, William Robak's paper on a study of the relative moisture-vapor resistance of paper and other materials in the packaging and wrapping of fruits, in the rapidly growing field of frozen food preservation, had an interesting commercial slant. Through very exhaustive experiments, he showed the relative efficiency of the principal types of materials now employed for that purpose, which will be helpful to paper manufacturers in making products which will give the most satisfaction and economy in this field.

At the close of the technical sessions Wednesday, a brief meeting of the Pacific Section was held, at which new officers were elected, as follows:

Chairman—Fred A. Olmsted, Crown Zellerbach Corp., Camas, Wash.

Vice chairman—W. N. Kelly, Weyerhaeuser Timber Co., Longview, Wash.

Secretary-treasurer—Fred Shaneman, Pennsylvania Salt Mfg. Co., Tacoma, Wash.

Members Executive Committee — W. R. Gibson, Northwest Filter Co. and N. W. Coster, Soundview Pulp Co., Everett, Wash.

Things began to happen with the arrival of the eastern delegates, who were welcomed at the train by Mayor Arthur B. Langlie of Seattle. All wearing ten gallon white hats, they were herded into the lobby of the Olympic by Miss Frances Martin, their official accordion-playing entertainer,

Above—M. B. Houston, Rayonier, Inc., smacks it. No wonder they put him on the finance committee. He certainly cashed in on this one. . . . Center—Lab. men doing field work. Emil Berger, laboratory chemist, St. Regis Kraft Company. . . . Below—Relaxing before the tee-off. H. W. Hall (left), Decolite Company, and I. J. Stafford, Neenah Paper Company.

WEST COAST HEMLOCK PULP

TIMBER for lumber and Weyerhaeuser bleached and unbleached sulphite pulp provides the background for this typical logging camp, one of the outposts of an integrated woods operation.

PULP DIVISION ‡ WEYERHAEUSER TIMBER COMPANY

1—On the seventh, but still a long way from 19. P. J. McGuire and W. W. King, Oliver United Filters Company; J. P. Rubush, Swenson Evaporator Company; and P. B. Varney, Weyerhaeuser Timber Company. . . . 2—The first foursome to reach the eighth green was made up of: W. A. Geiger, Weyerhaeuser Timber Company (Chicago); D. V. (Dink) Hamilton, Weyerhaeuser Timber Company (Everett); Fred Mullen and J. L. (Nip) Mullen, of the Hopper Paper Company. Here are three of them—you guess which three. The suspense was so great the photographer didn't ask—then they got away. . . . 3—Getting signed up at the first tee. M. C. Jones, Michigan Carton Company; R. J. Egan and M. R. Bailey, Bulkley Dunton Paper Company; Ralph Shaffer, Tacoma. . . . 4—Calling them from right to left ("that's right, you're wrong"): L. K. Smith, "Pacific Pulp & Paper Industry"; Erik Ekholm, Puget Sound Pulp & Timber Company; Frank Frothingham, Bird Machine Company; and Vern Samden.

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who had been with them on the train from Chicago. It seems that the train had also stopped over for some entertainment enroute, including a rodeo at Livingston, Montana, and some Indian business at Mandan, North Dakota.

At the dinner dance Tuesday evening, social activities got well under way. It was at this dinner that the presentation of the Pacific Section's Shibley Award was made. This award was for the best paper given by the younger mill men at the 1939-40 dinner meetings. It was won by Cecil L. Triplett of the Hawley Pulp & Paper Co., Oregon City, Ore., on the subject of "The Organic Concentrations in Sulphite Liquor." Vice President Ralph Hayward made the presentation speech and handed over the certificate as well as the prize that went with it.

Always of interest to those not familiar with the forests of the Pacific Northwest, and even to those familiar with the logging operations there, the woods trip held on Thursday was well patronized—by well over a hundred. It was under the auspices of the Soundview Pulp Co., and one of its important logging shows was inspected. General Manager Leo Burdon planned the trip and personally conducted it. A long drouth was broken that day—it rained a trifle, and Mr. Burdon was somewhat exercised over that fact. But shucks, who cared?

First, they boarded big Greyhound buses and traveled close to a hundred miles to Hamilton, where they left the buses for a special logging train and went through to Noosack Siding, pausing on the way to see a high climber climb 225 feet up a big fir, knock the top off to make a spar tree, and then descend with breath-taking jumps. The tree was three feet through at the point where he topped it. A little farther along two husky fallers knocked over another mammoth of the forest, so

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close to the track that had it fallen the wrong way, some of the TAPPIS suspected that they might be in the way.

At the Siding, one of the company's large skidder operations was watched with enthusiasm when five- to seven-foot logs were snaked down the mountain side four or five at a time by the skyline and then loaded on waiting cars with mighty, donkey-operated booms.

The party then came back a few miles and had a splendid lunch in the company's immaculate mess hall at Camp 18. If Leo Burdon had any misgivings about weather conditions, he certainly had none about appetite conditions, which were so good that they could practically be heard.

Owing to the dampness, the trip to Lake Grandy to see another type of logging operation was cancelled and instead, those who desired were taken for an inspection trip through the company's pulp mill at Everett.

Friday forenoon, a salmon derby was conducted which necessitated rising at about 4 a. m. A number of prizes were won for fish caught, the first prize going to Mrs. Anderson of Hamilton, Ohio. A woman, and from the East! That was something for the westerners to mull over. The prizes were announced at the banquet, the other winners being James d'a Clark, Institute of Paper Chemistry, Appleton, Wisconsin, second prize; J. J. MacDonald, Brown Company, New York, third prize.

It was the business of Ralph D. Dickey, Crown Zellerbach Corporation, Seattle, and Nat S. Rogers, of Van Waters & Rogers, Seattle, to look after the golf tournament at the Rainier Golf Club on Friday afternoon. But it was nobody's business the way that pair could sock a golf ball. In spite of and not because of his part in the arrangements, Dickey took the long ball record, a magnificent drive of 260 yards.

Nat Rogers, in a lengthy oration, which Dickey estimated lasted an hour and eighty-five minutes, announced the various winners and passed out the prizes at the banquet. Space here permits of only recording the first division winners—low gross, F. G. Keuss, St. Regis Kraft Co., Tacoma; low net, M. B. Houston, Rayonier, Inc., Seattle; best net in first nine, jointly to E. J. Bartells, E. J. Bartells Company, Seattle, and J. J. Stafford, Neenah Paper Company, Neenah, Wisconsin.

Winding up the banquet, remarks appropriate to the occasion were made by Mr. Hayward, who then introduced Dr. Charles Copeland Smith, speaker of the evening. He took for his subject: "Freedom, or American Dynamics." It was a wonderful address, delivered with an emotional effect that none better than himself knows how to engender. If anyone came away after hearing him, retaining the least suspicion of the defeatist frame of mind, that person deserves to be forever banished from that great brotherhood of TAPPI.

After the meeting, many of the delegates and members of their families who had accompanied them took advantage of the time to spend a wonderful vacation amid the scenic beauty of the Pacific Coast, and all agreed that the Coast may expect a return visit from TAPPI some time in the future.

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▶▶▶ A JOINT MEETING of the Southern Division and the Southeastern Division of the Superintendents Association has been announced to take place at Savannah, Georgia, November 1 and 2. Savannah was chosen for this meeting because it is strategically located, and a very good attendance from both divisions is expected. The first day will be devoted to business sessions with a banquet that night. Visits to nearby mills will be scheduled for the second day. Of course, there will be sports and a program for the ladies.

ALLIED

NEW FILM TELLS STORY OF NEOPRENE

The story of du Pont's Neoprene, a synthetic rubber-like material that is being used to replace natural rubber in a great many products, is told in a new sound motion picture produced by the du Pont organization. The timely twenty-minute film shows how the product is made, explains the chemical formula by means of animated cartoons, shows tests of the materials and pictures hundreds of applications of products made from it. The motion picture is available without charge to any organization having a 16 mm. sound projector. Bookings can be made through the Rubber Chemicals Division, E. I. du Pont de Nemours & Company, Wilmington, Delaware.

◆

▸▸▸ HERCULES POWDER COMPANY is to construct a plant at Parlin, New Jersey, which it will operate for the New Jersey Powder Company. The plant is to cost about $1,000,000.

◆

BOXBOARD COMPANY INSTALLS NEW TRUCKS

In order to meet a double problem —that of weighty handling problems and lack of storage space—the Ohio Boxboard Company recently installed several electric trucks manufactured by the Yale and Towne Manufacturing Company. These trucks were of the high lift tilting fork variety.

The trucks were able to utilize overhead storage space that previously had been wasted. Heavy rolls of paper, skid loads of flat stock and pallets of finished cartons could be stacked with the trucks to heights which were heretofore impossible. The trucks also reduced handling costs by speeding operations; picking up rolls of paper from the machines, transporting them to and storing them in the warehouse, moving them from the warehouse to the box making machine, carrying the cartons to the storage warehouses and thence into freight cars.

◆

▸▸▸ THE TURBINE PUMP BUSINESS of the Roots-Connersville Blower Corporation, Connersville, Indiana, has been sold to the Sterling Pump Corporation, Hamilton, Ohio. The latter firm will manufacture and sell water systems, condensate units and turbine pumps for general industrial applications hitherto handled by the Roots-Connersville organization.

◆

▸▸▸ EXPANSION OF The Dow Chemical Company's magnesium metal production at a Texas plant was indicated by a report which stated that the company would soon file a registration statement with the SEC for issuance of new securities for financing the expansion. The company seeks approval of a sale of $15,000,000 of 10-year debentures and $10,000,000 of common stock.

◆

▸▸▸ IN ORDER TO CENTRALIZE production and promote better customer service, the Chain Belt Company, Milwaukee, Wisconsin, has moved the manufacturing operations of its screw conveyor and light steel bucket divisions from the Chicago plant to the West Milwaukee works. The personnel of the Chicago plant has been moved with the operations and the Chicago plant has been discontinued.

◆

▸▸▸ A NEW SALES OFFICE is being opened in Houston, Texas, by the Reliance Electric and Engineering Company, Cleveland, it was announced recently. Frank A. Denison, Jr., a member of the company's Detroit sales engineering staff, will be district manager.

◆

NEW CHLORINE SAFETY CHART

That a new revised chlorine safety chart has recently been prepared by the Mathieson Alkali Works, Inc., New York City, is news of interest to all users of chlorine.

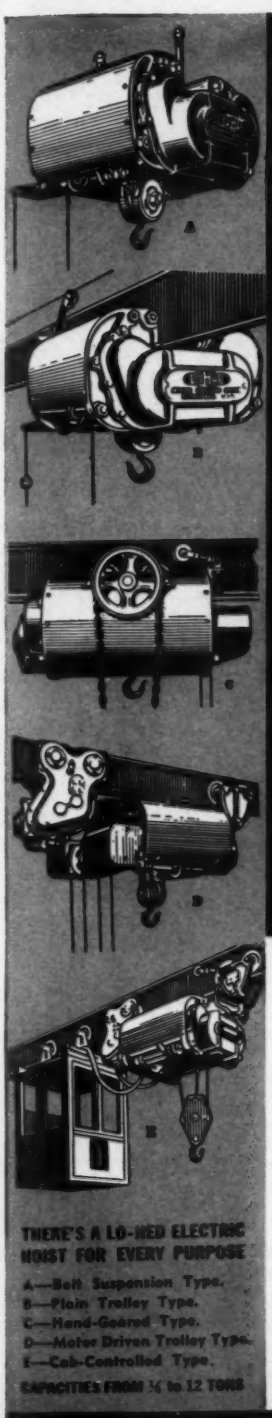
The chart, set up in green and black with cuts of the valves used on the three standard types of chlorine containers, is a schematic representation and careful labeling of the valve types greatly enhance the value of the chart.

The safe handling of liquid chlorine is outlined in the form of 24 suggestions, subdivided under handling containers, gas masks, chlorine leaks and first aid measures.

◆

▸▸▸ THE FIRM OF BUMSTEAD-WOOLFORD, recently formed sales organization with headquarters in Seattle, Washington, has been appointed to represent the Foxboro Company in the Oregon and Washington territory. The firm was organized by Dale Bumstead and O. H. Woolford, both of whom have long records of experience in the field of industrial engineering, and they will represent a number of other nationally-known industrial equipment manufacturers.

Left—Yale high lift tilting fork electric truck tiering wrapped cartons in warehouse of The Ohio Boxboard Co. Center—Truck transporting heavy skid loads of flat stock paper. Right—Large rolls being stocked in the warehouse.



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THE PAPER INDUSTRY ANNUAL SAFETY CONTEST

July 1, 1939 to June 30, 1940

Final Rankings of Contestants as of June 30, 1940

Division One—Paper and Pulp Mills

Final Rank	Unit	Man-Hrs. Worked	Disab. Inj.	Freq. Rate
	Group A (Units averaging 100,001 or more man-hours per month.)			
1	Price Brothers & Company, Ltd., Kenogami Paper Mills	2,258,785	1	.44
2	Anglo-Canadian Pulp & Paper Mills, Ltd., Limoiloi, Quebec, Canada	1,712,994	1	.58
3	Hollingsworth & Whitney Company, Waterville, Me.	3,365,605	9	2.67
4	Bird & Son, Inc., East Walpole, Mass.	1,513,602	5	3.30
5	The Mead Corporation, Chillicothe, Ohio	3,155,828	14	4.44
6	The Gardner-Richardson Co., Lockland, Ohio	1,701,978	8	4.70
7	Price Brothers & Co., Ltd., Riverbend, P. Q., Canada	1,454,863	7	4.81
8	Consolidated Paper Corp., Ltd., Laurentide, Grand 'Mere, P. Q., Canada	1,710,606	9	5.26
9	Marathon Paper Mills Co., Menasha Div.	2,275,180	12	5.27
10	Nekoosa Edwards Paper Co., Nekoosa Mill	1,301,589	7	5.38
11	Anglo-Newfoundland Development Co., Ltd., Grand Falls, Newfoundland	2,980,470	18	6.04
12	Consolidated Paper Corp., Ltd., Belgo, Shawinigan Falls, P. Q., Canada	1,284,293	8	6.23
13	Consolidated Paper Corp., Ltd., Port Alfred, P. Q., Can.	1,217,268	8	6.57
14	Canadian International Paper Co., Mill No. 16, Three Rivers, Quebec, Canada	1,855,607	14	7.54
15	Brown Paper Mill Co., Inc., Monroe, La.	2,114,370	16	7.57
16	International Paper Co., Hudson River Mill No. 3, Palmer, N. Y.	2,080,640	16	7.69
17	Bryant Paper Co., Kalamazoo, Mich.	2,142,798	19	8.87
18	International Paper Co., Otis No. 4, Chisholm, Me.	1,647,136	15	9.11
19	Consolidated Paper Corp., Ltd., Wayagamack, Three Rivers, P. Q., Canada	1,902,469	18	9.46
20	Kimberly-Clark Corp., Niagara Mill, Niagara, Wis.	1,258,456	12	9.54
21	Kimberly-Clark Corp., Kimberly Mill, Kimberly, Wis.	2,233,014	22	9.85
22	Nekoosa Edwards Paper Co., Port Edwards, Wis.	1,203,771	12	9.97
23	Kimberly-Clark Corp., Lakeview-Badger-Globe Mills, Neenah, Wis.	2,625,341	28	10.67
24	Hammermill Paper Co., Erie, Pa.	3,099,903	35	11.29
25	The Mead Corporation, Kingsport, Tenn.	1,601,707	19	11.86
26	Kieckhefer Container Co., Delair, N. J.	1,446,213	19	13.14
27	International Paper Co., Niagara Falls, N. Y.	1,711,363	23	13.44
28	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., Camas, Wash.	3,999,629	54	13.50
29	Marathon Paper Mills Co., Rothschild Div.	1,710,806	24	14.03
30	Fraser Paper Ltd., Edmundston, N. B., Canada	1,358,025	20	14.73
31	Gulf States Paper Corp., Tuscaloosa, Ala.	1,828,242	29	15.86
32	Masonite Corp., Laurel, Miss.	3,499,431	57	16.29
33	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., West Linn, Ore.	1,395,511	24	17.20
34	Kimberly-Clark Corp., Niagara Falls, N. Y.	2,661,200	46	17.29
35	The Gardner-Richardson Co., Middletown, Ohio	1,301,082	23	17.68
36	Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.	3,001,307	37	18.49
37	Container Corp. of America, Philadelphia, Pa.	1,880,676	36	19.14
38	Bathurst Power & Paper Co., Ltd., Bathurst, N. B., Can.	1,694,800	34	20.06
39	Rayonier Incorporated, Grays Harbor Div., Hoquiam, Wash.	1,301,914	28	21.51
40	Spruce Falls Power & Paper Co., Ltd., Kapuskasing, Ont., Canada	2,170,793	47	21.65
41	Alton Box Board Co., Alton, Ill.	1,336,170	44	32.93
42	The Northwest Paper Co., Cloquet, Minn.	2,183,215	72	32.98
	P-167	2,102,246*	16	7.61
	P-170	2,651,209*	26	9.81
	P-171	3,273,320*	41	12.53
	P-168	1,949,918*	31	25.94
	Group B (Units averaging 60,001 to 100,000 man-hours per month.)			
1	Hoberg Paper Mills, Inc., Division "A", Green Bay, Wis.	1,008,543	1	.99
2	St. Croix Paper Company, Woodland, Me.	846,377	1	1.18
3	P. H. Glatfelter Co., Spring Grove, Pa.	1,079,752	2	1.85
4	The Champion Paper & Fibre Co., Houston Div., Pasadena, Tex.	948,004	2	2.11
5	Paterson Parchment Paper Co., Bristol, Pa.	1,187,255	3	2.53
6	Quebec North Shore Paper Co., Baie Comeau, P.Q., Can.	1,017,763	3	2.95
7	Southern Kraft Corp., Continental Div., Marinette, Wis.	911,244	3	3.29
8	Pioneer Div.—The Flintkote Co., Los Angeles, Cal.	1,186,666	4	3.37
9	International Paper Co., North Tonawanda, N. Y.	727,968	3	4.12
10	Thilmany Pulp & Paper Co., Upper Mill, Kaukauna, Wis.	1,135,897	6	5.28
11	International Paper Co., Fort Edward, N. Y.	1,168,723	7	5.99
12	Detroit Sulphite Pulp & Paper Co., Detroit, Mich.	908,930	6	6.60
13	The Mead Corporation, Dill & Collins Co., Philadelphia, Pa.	1,178,405	11	9.33
14	A. P. W. Paper Co., Inc., Albany, N. Y.	1,086,436	12	11.05
15	Fibreboard Products Inc., Division II, Los Angeles, Cal.	1,126,640	14	12.43
16	Consolidated Water Power & Paper Co., Biron, Wis.	768,064	10	13.02
17	The Mead Corporation, John H. Heald Div., Lynchburg, Va.	964,865	13	13.47
18	Thilmany Pulp & Paper Co., Lower Mill, Kaukauna, Wis.	884,420	12	13.58
19	The Munising Paper Co., Munising, Mich.	829,679	12	14.46
20	Fraser Paper Ltd., Madawaska, Me.	1,174,082	17	14.48
21	Rayonier Incorporated, Port Angeles, Wash.	956,685	16	16.72
22	Mersey Paper Company, Ltd., Liverpool, N. S., Can.	1,189,325	22	18.50
23	Crown Zellerbach Corp., National Paper Products Co. Div., Port Townsend, Wash.	995,205	19	19.09
24	The Flintkote Co., New Orleans, La.	754,732	16	21.20
25	Container Corp. of America, Ogden Div., Chicago, Ill.	1,169,262	25	21.38
26	The Racquette River Paper Co., Potsdam, N. Y.	864,958	21	24.28
27	National Container Corp., Jacksonville, Fla.	875,352	22	25.13
28	Watervliet Paper Co., Watervliet, Mich.	947,436	26	27.44
29	North Carolina Pulp Co., Plymouth, N. C.	1,007,705	41	40.60
	P-107	1,074,193*	18	16.76
	P-128	900,982*	18	19.98
	P-172	1,078,201*	24	22.26
	P-83	818,314*	30	36.66
	Group C (Units averaging 30,001 to 60,000 man-hours per month.)			
1	Strathmore Paper Company, Woronoco Mills	538,231	0	0
2	Southern Kraft Corp., Continental Div., York Haven, Pa.	691,229	1	1.45
3	Escanaba Paper Company, Escanaba, Mich.	706,464	2	2.83
4	Strathmore Paper Co., West Springfield, Mass.	647,061	4	6.18
5	The Crystal Tissue Co., Middletown, Ohio	540,501	4	7.40
6	Donohue Brothers Ltd., La Malbaie, P. Q., Canada	492,809	4	8.12
7	Consolidated Water Power & Paper Co., Appleton, Wis.	432,192	4	9.26
8	Rising Paper Co., Housatonic, Mass.	494,602	5	10.11
9	Hoberg Paper Mills, Inc., Division "B", Green Bay, Wis.	493,744	5	10.13
10	Bedford Pulp & Paper Co., Big Island, Va.	459,424	5	10.88
11	Cornell Wood Products Co., Cornell, Wis.	634,302	7	11.21
12	Finch, Pruyn & Co., Inc., Glens Falls, N. Y.	536,337	6	11.40
13	The Eddy Paper Corporation, White Pigeon, Mich.	588,883	7	11.89
14	Central Fibre Products Co., Quincy, Ill.	622,881	8	12.84
15	Ontonagon Fibre Corp., Ontonagon, Mich.	420,535	8	19.02
16	Bemis Bro. Bag Co., Peoria, Ill.	700,780	14	19.98
17	The Flintkote Co., Lockport, N. Y.	389,531	8	20.54
18	The Lawrence Paper Co., Lawrence, Kan.	435,992	9	20.64
19	The Upson Company, Lockport, N. Y.	410,877	10	24.34
20	Bergstrom Paper Co., Neenah, Wis.	404,147	10	24.74
21	Container Corp. of America, Coated Board, Chicago, Ill.	516,861	14	27.09
22	Port Huron Sulphite & Paper Co., Pulp Mill, Port Huron, Mich.	410,433	15	36.55
23	Lee Paper Company, Vicksburg, Mich.	465,095	19	40.77
24	Port Huron Sulphite & Paper Co., Paper Mill, Port Huron, Mich.	366,500	18	49.11
25	Central Fibre Products Co., Hutchinson, Kan.	484,354	26	53.68
26	Container Corp. of America, Wabash	482,907	26	53.83
27	Union Bag & Paper Corp., Fenimore Paper Mill, Hudson Falls, N. Y.	387,560	21	54.19
28	Container Corp. of America, Fernandina, Fla.	395,790	39	98.54
	P-145	365,820*	2	5.47
	P-152	363,352*	5	13.76
	P-169	643,683*	11	17.09
	P-146	333,536*	8	23.99
	Group D (Units averaging 6,000 to 30,000 man-hours per month.)			
1	Sylva Paperboard Company, Sylva, N. C.	337,656	0	0
1	Spaulding Fibre Company, Inc., Milton Plant	190,367	0	0
1	United States Gypsum Company, North Kansas City, Mo.	183,742	0	0
1	International Paper Co., Livermore Mill	170,199	0	0
1	The Mead Corporation, Nashville Division	169,086	0	0
1	Hollingsworth & Whitney Company, Madison, Me.	128,572	0	0
1	International Paper Co., Riley Mill	116,074	0	0
1	Spaulding Fibre Company, Inc., Hayes Plant	82,061	0	0
9	The Mead Corporation, The Harriman Co., Harriman, Tenn.	338,191	1	2.97
10	Bird & Son, Inc., Phillipsdale, R. I.	324,491	1	3.08
11	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., Lebanon, Ore.	296,891	1	3.37
12	Rogers Fibre Co., Inc., Fibreboard Mill, Div. 1, Bar Mills, Me.	158,541	2	12.62
13	International Paper Co., Webster Mill, Orono, Me.	279,935	4	14.29
14	American Asphalt Roof Corp., East St. Louis, Ill.	232,806	4	17.18
15	American Asphalt Roof Corp., Kansas City, Mo.	162,963	3	18.41
16	Consolidated Water Power & Paper Co., Stevens Point, Wis.	260,759	5	19.17
17	The Mead Corporation, Southern Extract Co., Knoxville, Tenn.	336,001	7	20.83
18	Central Fibre Products Co., Mt. Carmel, Ill.	130,575	3	22.98
19	Fort Orange Paper Co., Box Board Mill, Castleton on Hudson, N. Y.	278,501	7	25.13
20	Container Corp. of America, Circleville, Ohio	264,835	7	26.43
21	Union Bag & Paper Corp., Allen Paper Mill, Hudson Falls, N. Y.	208,720	8	26.76
22	Central Fibre Products Co., Vincennes, Ind.	143,543	4	27.87
23	Central Fibre Products Co., Tama, Iowa	316,299	10	31.62
24	Fernstrom Paper Mills, Inc., Pomona, Cal.	344,664	12	34.82
25	French Paper Co., Niles, Mich.	278,820	10	35.87
26	Container Corp. of America, Carthage	351,173	13	37.02
27	The Mead Corporation, Wheelwright Div., Leominster, Mass.	334,456	13	40.06
28	Fir-Tex Insulating Board Co., St. Helens, Ore.	314,747	19	60.37
29	The Northwest Paper Co., Brainerd, Minn.	309,720	19	61.35
30	Alton Box Board Co., Lafayette, Ind.	196,443	14	71.27
	P-150	230,017*	1	4.35
	P-106	257,010*	2	7.78
	P-151	302,393*	3	9.92
	P-149	161,518*	4	24.77
	P-147	135,138*	4	29.60

(*Concluded on page 587*)

Division Two—Paper and Board Re-Manufacturing Plants

Final Rank	Unit	Man-Hrs. Worked	Disab. Inj.	Freq. Rate
1	Bay West Paper Co., Green Bay, Wis.	97,663	0	0
2	St. Louis Container Plant—Gaylord Container Corp.	1,088,307	2	1.93
3	Kimberly-Clark Corporation, Atlas Mill	329,865	1	3.03
4	Union Bag & Paper Corp., Grocer Bag Factory, Hudson Falls, N. Y.	484,330	2	4.13
5	Container Corp. of America, Chicago, Ill.	677,906	3	4.43
6	Union Bag & Paper Corp., Chicago Bag Factory, Chicago, Ill.	540,416	3	5.55
7	Bird & Son, Inc., Norwood, Mass.	934,065	6	6.42
8	The Flintkote Co., East Rutherford, N. J.	895,892	6	6.70
9	Bird & Son, Inc., Shreveport, La.	144,006	1	6.94
10	Bird & Son, Inc., Chicago, Ill.	258,442	2	7.74
11	Dixie-Vortex Co., Easton, Pa.	1,298,420	11	8.47
12	Fort Orange Paper Co., Paper Box Plant, Castleton on Hudson, N. Y.	577,810	5	8.65
13	The Flintkote Company, Chicago Heights, Ill.	702,872	7	9.96
14	Chicago Carton Co., Chicago, Ill.	740,416	9	12.16
15	Union Bag & Paper Corp., Specialty Bag Factory, Hudson Falls, N. Y.	881,160	11	12.48
16	Barber Asphalt Corp., Madison, Ill.	307,105	4	13.02
17	Barber Asphalt Corp., Barber, N. J.	533,691	8	14.99
18	The Container Co., Van Wert, Ohio	443,529	7	15.77
19	Gaylord Container Corp., Dallas, Tex.	172,444	3	17.40
20	Gaylord Container Corp., Bogalusa, La.	885,100	16	18.06
21	Container Corp. of America, Anderson, Ind.	263,277	5	19.06
22	Marathon Paper Mills Co., Wausau Div.	616,612	14	22.70
23	R-29	666,635	16	24.00
24	Container Corp. of America, Natick, Mass.	157,912	4	25.33
25	Container Corp. of America, Cleveland, Ohio	270,474	8	29.58
26	Gaylord Container Corp., Houston Plant	146,563	11	75.05
	R-24	490,923*	7	14.26
	R-31	311,610*	5	16.05
	R-26	359,893*	9	25.01

*June report missing—not ranked.
P-124, Withdrawn.

SUMMARY

1) The 1939-1940 Contest set a new high mark for participation—175 mills and factories. The Contest was the fourteenth conducted by the Paper and Pulp Section.

2) The competition covered 77,128 employees who worked 164,621,000 man-hours during the year. This also exceeds the exposure for any previous year.

3) The average rate for all participants was 13.35. Paper mills had the highest rates, averaging 13.46 against 12.22 for remanufacturing.

4) Frequency rates averaged 2 per cent above the rates in the 1938-1939 competition. Rates increased 2 per cent in paper mills and 6 per cent in remanufacturing. Only two groups consisting of the smallest paper mills were successful in improving their rates.

5) The following tabulation summarizes the 1939-1940 experience:

Divisions	No. of Units	No. of Employees	No. of Man-Hours	No. of Injuries	Frequency Rate	Per cent change over 1938-9
Total	175	77,128	164,620,962	2,197	13.35	+2%
Paper Mills	146	69,467	149,394,632	2,011	13.46	+2%
A	46	42,842	92,400,366	1,064	11.52	+8%
B	33	15,276	32,752,163	440	13.43	+4%
C	32	7,530	15,836,593	325	20.52	−5%
D	35	4,019	8,405,510	182	21.65	−9%
Remanufacturing	29	7,661	15,226,330	186	12.22	+6%

NATIONAL DEFENSE WILL BE THEME OF ANNUAL CONGRESS

A preview of the 29th National Safety Congress and Exposition to be held October 7-11 at the Stevens Hotel, Chicago, indicates that national defense will serve as a theme for the annual meeting. The role of safety in national defense will be brought out by decorative schemes and a number of papers will emphasize the need for conservation of man power and energy in times of national emergency.

The Paper and Pulp Section of the Congress will meet at 2:30 P. M. on October 7 at which time Chairman D. B. Chant will present progress report of the sectional committees which will be followed by twenty-minute talks on safe handling of materials. F. W. Braun will then review 1939-1940 accident experiences. The ensuing days will be taken up with pertinent papers on such important subjects as "Practical Uses of Accident Cost Data," "Woods Operations," "Paper Products Manufacturing," "Printing and Publishing," "Safety From Woods to Mill," and other interesting presentations.

On Thursday, October 10, The Paper and Pulp Sections will hold its annual luncheon at which time a report of the 1939-40 safety contest will be presented and awards made.

You are Cordially Invited to Attend the

29TH ANNUAL

NATIONAL SAFETY CONGRESS AND EXPOSITION

Stevens Hotel - Chicago - October 7-11

●

Some of the Sessions and Activities of the

PAPER AND PULP SECTION

include:

Safe Handling of Materials

Review of 1939-40 Accident Experience

Cost Data and the Safety Program

Paper Products Manufacturing

Printing and Publishing

Safety From Woods to Mill

Report of 1939-40 Safety Contest

Presentation of Awards

Entertainment for All

●

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NAMES *in the* NEWS

Personals

NEKOOSA-EDWARDS RETIRES OLD-TIMERS

Of the nine men recently retired by the Nekoosa-Edwards Paper Company because they had passed their seventieth birthdays, four of the men have records of over 40 years of service with Nepco.

Dominic Wipfli, the oldest man both in age and years of service, had been with the company for 46 years. In July, 1894, he was put to work on the dam but was transferred shortly to the old spruce wood room, which has since been replaced by the present kraft wet room. After a few years he was transferred to the shipping room where he remained for forty years.

Frank Gisler, with 45 years of service, came to work for Nepco in 1895, starting at the old South Side paper mill, the first paper mill on the Wisconsin River. When this mill burned in 1914 Frank was transferred to the finishing room in the Port Edwards mill.

The second member of the Wipfli family to arrive was Anton, who came in 1896. He also worked in the spruce wet room of the Nekoosa mill for a short time but, like his brother, Dominic, was transferred to the Nekoosa shipping room where he rounded out 44 years of Nepco service.

Louis Wipfli, the third brother to arrive at Nekoosa, began working in the shipping room in October, 1897. For two years Louis was foreman of the finishing room in the Nekoosa mill, and for the past 22 years he has been the Nekoosa sample clerk.

◆

G-E EXECUTIVES ARE RETIRED

E. Arthur Baldwin and Otto Pruessman, vice president and European and Far Eastern manager, respectively, of the International General Electric Company, have retired from the company, effective September 1.

Mr. Baldwin joined G-E in 1898 and was appointed manager of the European department in 1919. He went to Paris in 1927 as general European manager and was elected a vice president the following year. Mr. Baldwin was active in international affairs and was decorated by the Government of France for his services to that country. He served as president of the American Chamber of Commerce in France for many years.

Mr. Pruessman was formerly associated with the Western Electric Company. He was sent to Japan as a representative of the company in 1918 and the following year he joined International G-E in Japan. He was named Far Eastern manager in 1927 and was elected a vice president the following year.

◆

PROMOTIONS BY E. C. ATKINS CO.

Succeeding the late Fred Gardner as secretary and treasurer of E. C. Atkins and Company, Indianapolis, is Don H. Potter who has been associated with the saw manufacturing company for twen-

D. H. Potter

ty-five years. Mr. Potter is a member of the Atkins Pioneer Club and is well known in the saw industry. It was also announced that Major M. Poole, purchasing agent for the Atkins organization since 1906, has been elected to the board of directors.

◆

▶▶▶ *William C. Bennett* is now manager of the newly-created appliance sales division of the Cochrane Corporation, Philadelphia. *John E. Fearon* has been placed in charge of the flow meter sales section and *Edward J. Glinske* will take charge of application engineering, proposals and order details in the company's specialties section.

NIXON NOW A V. P. OF HERCULES

A. B. Nixon, director and formerly general manager of the Hercules Powder Company's Naval Stores Department was elected a vice president and a member of the executive committee, succeeding G. G. Rheuby who resigned recently. A. E. Forster, assistant general manager of the Naval Stores Department, has succeeded Mr. Nixon as general manager.

Mr. Nixon became associated with Hercules as a chemist in 1915, later becoming assistant superintendent at the company's acetone kelp plant in San Diego, California. In 1934, he was appointed general manager of the Naval Stores Department after various promotions. Mr. Rheuby became general counsel for the Hercules organization when it was organized in 1912. Prior to this he had been assistant general counsel for the du Pont organization. He became a vice president in 1930 and will continue as a director.

◆

▶▶▶ *K. D. Tracey,* formerly advertising manager for the Baker-Raulang Company, Cleveland, is now associated with the Harris-Seybold-Potter Company and will be located at Dayton, Ohio, where he will act as assistant to *John C. Dabney,* sales manager of the company's Seybold Division. *W. M. McMillan* has become advertising manager of the Baker-Raulang Company.

◆

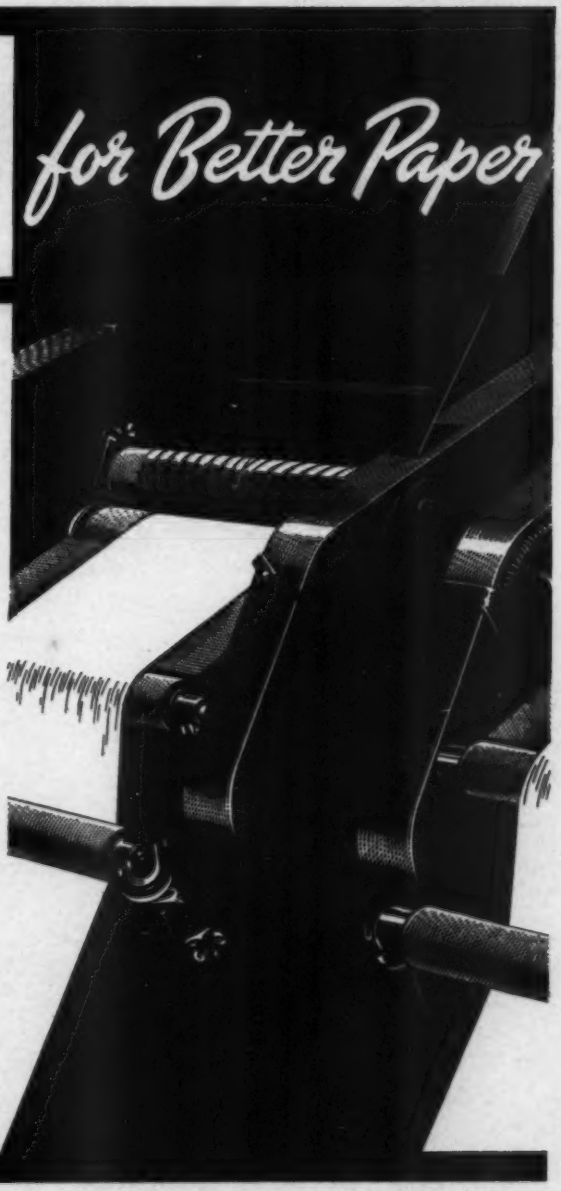
▶▶▶ *R. B. Whittemore,* manager of the York (Pennsylvania) plant of Certain-teed Products Corporation, has resigned his post, effective August 31. Mr. Whittemore, after a vacation in St. Louis, is to return to York but as yet has announced no plans for the future.

◆

TWO CANADIANS AWARDED D.S.C.

A supplement of the *London Gazette* announced on August 2 that two further Distinguished Service Cross awards had been made to Canadians for "courage and resource in the withdrawal of troops from the neighborhood of Le Havre." One of the recipients of the honor is Sub-Lieutenant Leslie McLernon, of Montreal, son of S. A. McLernon, general manager of the Nash Engineering Company

Du Pont CHEMICALS *for Better Paper*



• **Because Du Pont has always worked hand in hand with industry through continuous research and engineering development, tomorrow's chemicals are yours today.**

Producers of fine paper, book paper, newsprint, kraft and pulp, will find in Du Pont Chemicals the uniformity and quality that helps make better paper. That's why Du Pont Chemicals are the choice of many leaders in the paper industry. Buy paper chemicals consistent with your own high standards — make your next order — Du Pont.

FLAME PROOFING
Several new fire retardants are now being used for protection against spread of flame and afterglow. Write for further information.

Acetate of Lead
Aluminum Sulfate Commercial, Iron Free
Aqua Ammonia
Barium Carbonate
Barium Chloride
Barium Sulfate (Blanc Fixe)
Bleach
Caustic Soda
C. P. Ammonium Hydroxide
C. P. Hydrochloric Acid
C. P. Nitric Acid
C. P. Sulfuric Acid
Muriatic Acid
Salt Cake
Silicate of Soda
Soda Ash
Sulfuric Acid
Tri-Sodium Phosphate
Tetra Sodium Pyro Phosphate

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of Canada, Ltd. The other is Sub-Lieutenant David Killam, of Vancouver, son of Lawrence Killam, president of the British Columbia Pulp and Paper Company. Both officers are in the Royal Canadian Navy.

◆

SHEEHAN NOW PRESIDENT OF MISSIQUOI CORP.

Walter B. Sheehan of Holyoke, Massachusetts, has been elected president of the Missiquoi Corporation, St. Albans, Vermont, to succeed the late E. H. Raymond. Mr. Sheehan was formerly vice president and treasurer, and had been associated with the company since 1917. He has also taken an active part in the associations of the industry.

Succeeding Mr. Sheehan are Edson R. Lyman, long a potent force in the Salesmen's Association of the Paper Industry who has been advanced to executive vice president, and John A. Gale, who has been made treasurer. H. E. Raymond, Jr., son of the late president, has been made a director of the company.

◆

▶▶▶ Now general manager of the Fitchburg Paper Company, Fitchburg, Massachusetts, is *William H. Kenety,* formerly managing director of the Book Paper Manufacturers Association, Mr. Kenety, a well known paper executive, was general manager of the Northwest Paper Company at Cloquet, Minnesota, before his association position.

◆

de VRIES WITH PARSONS AND WHITTEMORE

Eli de Vries, who up to a short time ago had his own paper export organization in Holland, is now a vice president of the Parsons & Whittemore, Inc., organization, well-known paper export firm in New York City. The combination of interests has enabled the company to have a wide connection all over the world. Mr. de Vries has connections with India, Dutch East Indies, China, Burma and the Far East.

◆

DR. HERBERT ROWE NOW WITH NEPCO

Dr. Herbert Rowe, a graduate of the Institute of Paper Chemistry at Appleton, Wisconsin, was recently added to the staff of the main laboratory of the Nekoosa-Edwards Paper Company at Port Edwards, Wisconsin. Dr. Rowe is working with other members of the staff on quality and standards control.

Dr. Rowe, a native of Indiana, received an A.B. degree from Wabash College in 1936. After leaving Wabash he did graduate work at Purdue University and then went to the Institute of Paper Chemistry where he was awarded a Master of Science degree in 1938 and received his Ph.D. in 1940.

◆

HUBBARD LEAVES HARRIS-SEYBOLD-POTTER COMPANY

Howard M. Hubbard, formerly secretary-treasurer of the Harris-Seybold-Potter Company, Cleveland, is now president and general manager of the Greenfield Tap and Die Corporation, Greenfield, Massachusetts. He assumed his new duties on September 1.

In returning to his native New England, Mr. Hubbard terminates 10 years

Howard M. Hubbard

of service with the Harris-Seybold-Potter organization. He became secretary of the firm in 1931 and treasurer in 1936. In the move that takes Mr. Hubbard to Greenfield, the former president, Donald G. Miller, becomes chairman of the board.

◆

▶▶▶ Well known in power engineering circles, *Dr. A. A. Potter,* dean of engineering at Purdue University, Lafayette, Indiana, was honored recently by receiving the Lamme Medal of the Society for the Promotion of Engineering Education. Dr. Potter is the author of a number of books on power engineering and has served as advisory editor for a number of power and engineering journals.

▶▶▶ *John H. Smith* of Portland, Oregon, has been made president of the Hawley Pulp and Paper Company, it was announced recently. Mr. Smith succeeds the late Watson Eastman.

◆

▶▶▶ *Carl Oechsle,* sales manager of the Worthington Pump and Machinery Company's Washington (D. C.) area for the past five years, is now general sales manager of the Holyoke (Massachusetts) works. He succeeds *W. A. Neill* who is now in New York City.

◆

▶▶▶ Formerly associated with the West Virginia Pulp and Paper Company, *E. L. Luaces* has established offices in New York City where he will engage in patent practice in chemistry, metallurgy and engineering.

◆

▶▶▶ *E. D. Otty,* superintendent of the sulphite mill of the Canadian International Paper Company's Dalhousie (New Brunswick) plant, has been delegated to recruit and command a new battery of artillery for the non-permanent militia.

◆

H. S. FOLEY NOW POWELL RIVER PRES.

Now president of the Powell River Company is Harold S. Foley who succeeds S. D. Brooks, new chairman of the board of directors. The change was announced following a recent annual meeting of the company at its head office in Vancouver, B. C. Mr. Foley has been executive vice president of the company for the past several years. R. Bell Irving and G. F. Laing were elected vice presidents.

◆

▶▶▶ *Major A. E. Parlow,* formerly of the British Columbia Forestry Service, is now recruiting a new military unit, the Sixth Company, Canadian Forestry Corps.

◆

▶▶▶ *Dr. Lincoln T. Work,* associate professor of chemical engineering at Columbia University, has been appointed director of research of the Metal and Thermit Corporation, New York City. Dr. Work has conducted research for a number of industrial concerns in the cement, clay, air conditioning, pulp and paper and plastic fields. The Metal and Thermit Corporations research activities including work in electric arc and Thermit welding, pigments, metals and alloys, and various phases of chemical and metallurgical engineering will be under Dr. Work's supervision.

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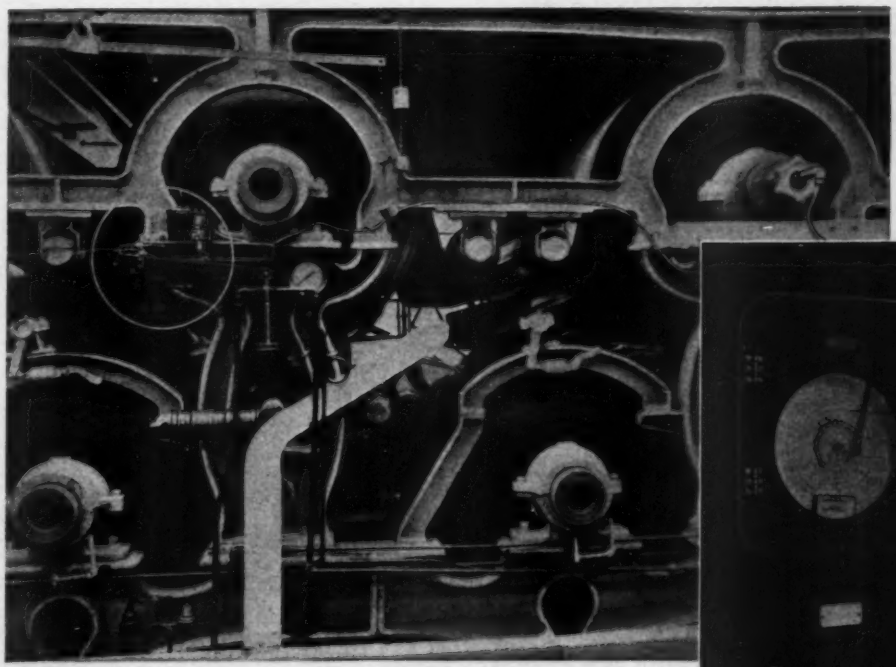
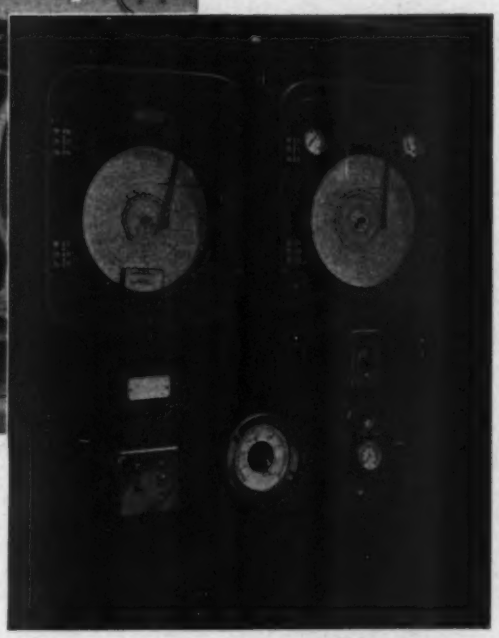
Moisture Control with TENSO-TEMP



Tenso-Temp Controller on the right controls temperature of dryer. Recorder is making permanent record of steam pressure in dryers and engine back pressure.



Tenso-Temp Moisture Control is saving paper-makers money on over half a hundred machines today—through better finish and less waste. Practical engineering has made Tenso-Temp—

SENSITIVE to the slightest variations in moisture content of the sheet. Precise adjustability enables you to maintain any desired moisture up to as high as the sheet will carry.

ECONOMICAL because first cost is low, considering the benefits derived and the excellence of control—and maintenance as well as operating costs are minimum.

ACCURATE because moisture content indication is averaged for the *full width of the sheet;* and response is instantaneous. Thus variations in weight across the sheet do not produce false indication and inaccurate control.

Tenso-Temp Moisture Control can easily be adapted to your present machines. If you are not already familiar with Tenso-Temp it will pay you to investigate. Write for Bulletins.

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Necrology

WILLIAM H. MASON

American industry lost one of its most important and influential figures with the recent passing of William H. Mason, inventor of the Masonite process and vice president of the Masonite Corporation. Mr. Mason passed away August 24 in Rochester, Minnesota, after a sudden illness.

Mr. Mason, born in West Virginia 63 years ago, began his career as an inventor at an early age, attempting, at the age of six or seven, an improvement on a "break cart" used for breaking horses to harness. The invention didn't work but it was indicative of his nature that the rest of his life from that time on was devoted to finding new ways of doing new things.

His college career at Washington & Lee and Cornell was interrupted with the advent of the Spanish American war in which he served as a naval engineer. Following the war Mr. Mason

Wm. H. Mason

was employed by the late Thomas A. Edison as a draughtsman and was put to work on Edison's cement plant at New Village, N. J. This was the beginning of a 17-year association with Edison during which they became close friends. The World War brought an end to this association when Mr. Mason was placed in charge of all construction for the U. S. Merchant Shipbuilding Corporation.

Long interested in the waste of the average sawmill, Mr. Mason finally devised his "explosion" process of reducing wood chips to cellulose fiber. He found that the lignin that remained made it too harsh for the paper industry but instead of stopping work, he turned the obstacle into an advantage, pressing the fibrous mass into boards. The result was a high quality insulation board, light in weight but strong. Further research resulted in the dense, hard-surfaced board he sought.

Mr. Mason took his process to the Wausau (Wisconsin) group of lumbermen who were owners of the sawmill where he had been conducting his experiments. They entered into an agreement to back him. The Mason Fibre Company was born and from it eventually grew the Masonite Corporation.

Surviving Mr. Mason are his widow and two daughters.

◆

▶▶▶ This magazine records with deep regret the passing of *Mrs. John D. Henderson,* suddenly, on September 5, at the Henderson home in Edison Park, Chicago. Mr. Henderson is well known throughout the industry, having been a member of the Fritz Publications staff for many years. Mrs. Henderson leaves a daughter and a son. Her mother and a brother also survive.

◆

NORMAN N. FOWLER

President of the Hampden Glazed Paper and Card Company and a forceful figure in the industrial life of Holyoke, Massachusetts, for more than 50 years, Norman N. Fowler passed away recently at the age of 83.

Mr. Fowler was the last of the four Fowler brothers who were such vigorous forces in Holyoke's paper industry. Born in Awagam, Massachusetts, in 1857, Mr. Fowler attended the schools of that town, later attending the Yale Scientific School and Yale Law School. He opened a law office in Springfield but later assisted his brothers in the coating mill they had organized. This was the beginning of the present Hampden Glazed Paper and Card Company.

Mr. Fowler is survived by his two sons and a daughter.

◆

WILLIAM F. McCLOSKY

William F. McClosky, an official of Hoberg Paper Mills, Inc., Green Bay, Wisconsin, passed away suddenly August 4. He was 77 years of age and had been connected with Hoberg for almost twenty years.

Mr. McClosky had resided in Green Bay since 1887, first becoming connected with the old Green Bay Paper and Fibre Company. When that firm merged with the Hoberg organization, Mr. McClosky was named credit manager and purchasing agent. He was connected with these departments at the time of his passing.

Surviving Mr. McClosky are his widow, a daughter and three sons. One son is connected with the Hoberg company.

◆

FRANK J. HARWOOD

Frank James Harwood, president and general manager of the Appleton Woolen Mills, Appleton, Wisconsin, passed away August 19 at his home in Appleton. He was one of the oldest industrialists in that city and was foremost in its civic affairs.

Frank J. Harwood

In 1881, Mr. Harwood became general manager of the Appleton Woolen Mills which succeeded Hutchinson and Company. He had retained active management of the plant since then until last April when he became incapacitated on account of an accident. He was also active in other interests among which were the Northern Paper Mills, Green Bay, Wisconsin, of which he was a director; and the Eagle Manufacturing Company, of which he was president. He had been nationally prominent in religious organizations and the YMCA.

Surviving Mr. Harwood are his widow and two daughters.

◆

▶▶▶ *William L. Fewsmith,* manager of publicity and advertising for Robins Conveying Belt Company, Passaic, New Jersey, passed away August 15 after a brief illness. A member of the Robins organization since 1913, Mr. Fewsmith became associated with advertising in that organization in 1924. He was 61 years of age.

◆

▶▶▶ *William G. Price,* nephew of the late Sir William Price, was fatally injured in a paper mill accident at the Riverbend (Quebec) mill of Price Brothers and Company. He is survived by his widow and parents.

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designed to meet your mill requirements—always in step with modern advancements in paper making. Today standard for quality and service, in addition to dependability. That's why APPLETON FELTS MAKE GOOD PAPER.

APPLETON WOOLEN MILLS

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Notes on the Use of Starch in Papermaking

B. W. ROWLAND, Research Associate
The Institute of Paper Chemistry

For the purpose of the present discussion, it is assumed that the starch on the cellulose surface is colloidally absorbed and constituted of colloidal micelles of amylose. Less perfect distribution of the starch on the fiber surface, represents a common example of a somewhat faulty and compromising application of starch, compromising, because to some extent, defective distribution of starch among the fibers may be compensated by improved retention of a mechanical nature owing to the presence of larger and filterable starch particles.

For larger amounts of colloidal starch—i. e., sufficient to form a continuous gelatinous film over the fiber surfaces—it is probable that the cellulose-to-cellulose bond becomes of secondary importance and functions only as a bond from cellulose to starch to cellulose. In the latter instance, the gelatinous cohesive character of the starch also becomes important. That this may attain a great magnitude has been shown in studies of the physical properties of unsupported starch films which, in cases of partial structural orientation, exhibit tensile properties of the order of one-half that of cast iron.

Although the bond between cellulose and starch has not been quantitatively measured, it must be of a similar magnitude. Thus, the amylose adhesives belong to a class of gelatinous materials containing strongly polar groups acting cohesively as well as adhesively. The properties of other adhesive carbohydrate gums, such as locust bean gum, are similarly derived.

From the fact that raw starch can be dried to form aggregates that easily crumble apart, it follows that (1) either there are relatively few hydroxyls resident on the surface group, or that (2) such hydroxyls as may be present are well occupied with films of adsorbed matter.

It also follows that the addition of dry, uncooked, and unconverted starch to the beater may produce no results at all or will yield improvements in sheet strength only to the extent that some conditions may be present which will very materially alter the starch grains.

Our experience indicates that for a given set of mechanical conditions, especially jordan setting, the starch may be introduced in such a precise condition of swelling that the mechanical action is just sufficient to disrupt the starch particles and the anticipated beneficial results are obtained. Rupture of the swollen grain and a liberation of the soluble amylose renders available the adhesive potentialities through the amylose hydroxyls. If, however, the forces of mechanical disruption are too intense, much of the effectiveness of the starch is lost—a consequence of too extensive structural breakdown of the amylose gel, probably resulting also in lower retention. Optimum results in the use of semicooked starch thus becomes dependent upon a rather critical set of conditions and the precise condition of the starch when furnished. Any alteration of the mechanical conditions will then throw the starch condition out of adjustment.

If the starch is completely cooked before addition to the beater, even mild jordan action will mechanically destroy the amylose gels to such an extent that retention and adhesive qualities are apparently damaged. In an effort to toughen the starch to such a degree that jordan breakdown of starch will not be too extensive, we have modified starch with toughening agents, such as formaldehyde, so that it is more readily possible to adjust the starch to a given set of operating conditions. The purpose of the application of the formaldehyde-treated starches is that it permits of a more thorough cooking of the starch without at the same time reducing the starch to a dispersion, which subsequently is completely broken down by the jordan action. Similar results are obtained by Roberts, who prepared the starch with gelatinization inhibitors.

In the cooking of starch it appears that optimum conditions of cook are attained immediately after the swollen starch grains are broken. This point is reached for tapioca at 88 to 90 deg. C., and for cornstarch at 93 deg. C.

Modified or cold water-soluble starches continue to be employed in the beater. The effectiveness of a given starch will depend not only on its type but also on the mechanical features of the operation. Some of these modified starches are effective, and certainly this is the most convenient method of starch application to the wet end, as it obviates the cooking operation. The cooking operation may, however, be greatly simplified as, for example, by the continuous injection of starch into hot water and thence to the furnish as developed by Swett. For this purpose easy-gelatinizing starch compositions are employed.

In the Swett cooking procedure, the uncooked starch is first made into a 3 pounds-per-gallon slurry in cold water, usually with a small amount of cooked starch present to prevent settling. It is then run at a constant rate through a metering device into a cooking chamber which in turn is supplied at a constant rate with water at 200 deg. Fahr. The hot starch is then led to the paper machine, generally to the fan pump. The obvious advantages of this cooking process include the possibility of rapid adjustment of the quantity of starch furnished, and the elimination of the troublesome batch cooking operation with its labor costs and hazards.

In the opinion of the writer, the use of starch after the jordan with special control, constitutes the most effective procedure for wet end application. These views were expressed a number of years ago and subsequent experience has further supported statements made at that time. In the intervening years a number of installations have been made for properly cooking and precipitating starch in the furnish after the stock has passed through the severe mechanical action. The developments have unfortunately been somewhat clouded by patent matters, but this has now become clarified by a recent issue to the writer, this patent dominating the pertinent features of a patent previously issued to others. The technique consists essentially of three important features: (1) the proper preparation of the starch, (2) the precipitation of the starch with the correct amounts of alumina hydrate, preferably formed in the furnish after the starch addition has been distributed throughout the furnish, and (3) the whole operation taking place after the jordaning. Under these circumstances the starch may be furnished in an ideal colloidal state, which is not subject to serious alteration subsequently. For this purpose the starch is cooked just past the bursting point of the swollen grains. After the starch is distributed in the furnish, alumina is generated by the addition of an alkali, such as caustic, sodium aluminate, or silicate, and the *p*H subsequently adjusted if desired with further alum. The *p*H should finally be somewhat above that range at which alumina will redissolve in considerable amounts, although fair results have been obtained even at relatively low *p*H's.

Unless some agency, such as mechanical filtration or a precipitating agent, is present, starch is not extensively held to the surface of the pulp fibers. In fact, the same forces which are desirable to keep fiber bundles separated will act in the same way to reduce the effects between the starch and the fibers, although starch may be strongly adsorbed in surface films.

It appears that in many instances an undue importance is placed on the retention of starch. Not even excepting matters of economy, the overall advantages of starch additions involve not only retention but the effectiveness of such starch as is retained but also its distribution through the fiber mass. Thus, it is obviously possible to have a high retention of improperly prepared starch showing poor reinforcing action in the sheet and being held by filtering action, nonuniformly distributed through the sheet. Our preference, accordingly, is to so prepare and add the starch that it will be attached to every fiber in the furnish and in this way to insure an even starch distribution through the sheet. If, under these conditions, the starch is present in a form such that the adhesive properties have not been impaired by chemical or mechanical action, the strength improvement in the sheet, especially burst

The first abridgments of papers presented at the fall meeting of the Technical Association of the Pulp and Paper Industry in Seattle, Washington, August 20-23 are published herewith. More abridgments of these papers will be presented in succeeding issues.

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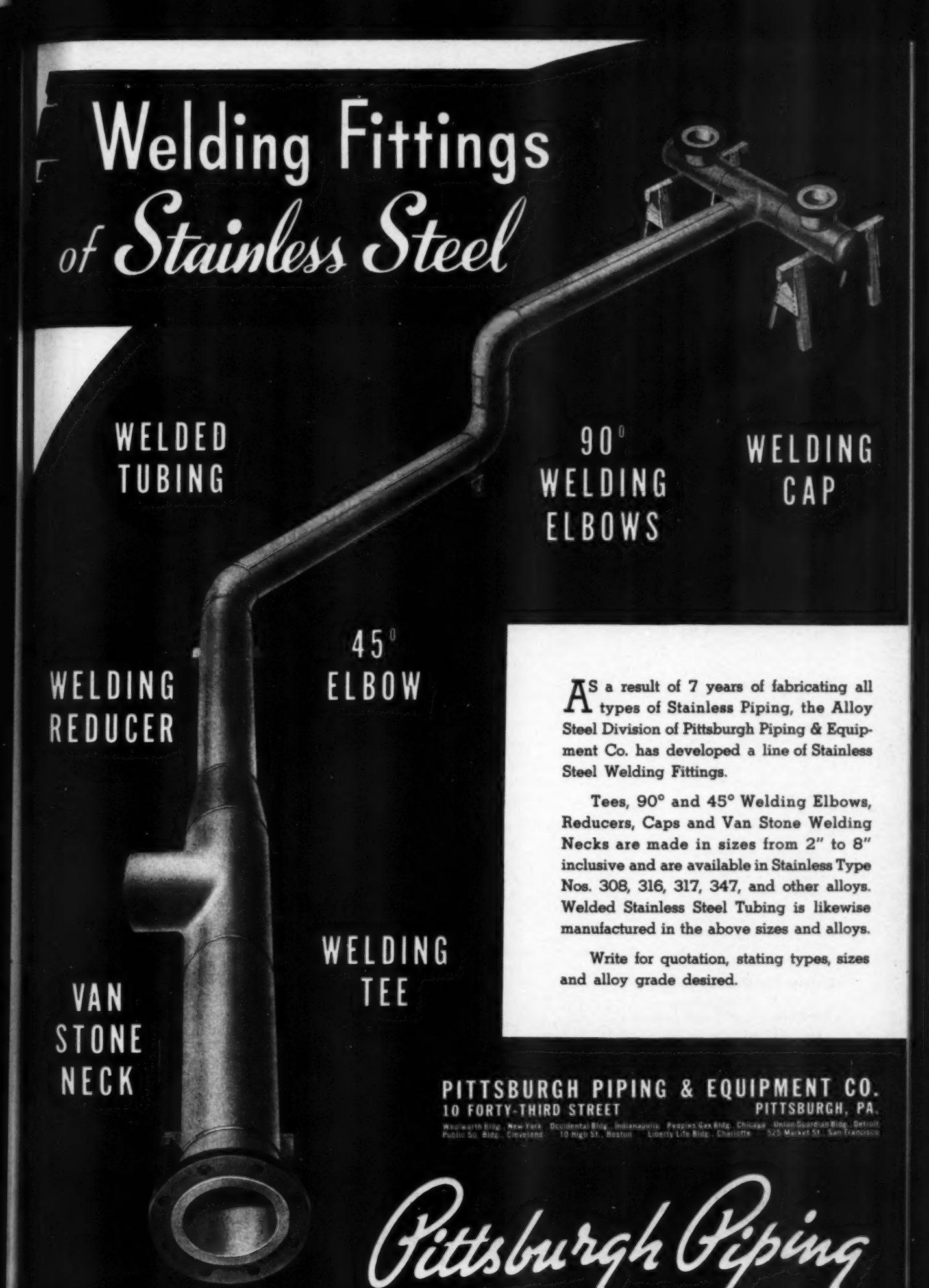

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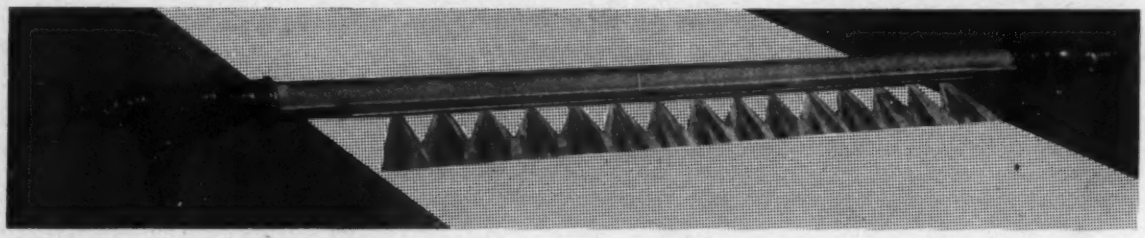

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and fold, is remarkably good, and in the opinion of the writer, the best obtainable by starch. In general, it appears more readily possible to secure high burst rather than high fold, the latter property being more impaired by errors in starch preparation and application. Fold, however, may be surprisingly improved and maintained when these conditions are satisfied.

The increased use of starches in tub sizing and coating, the latter particularly with reference to so-called machine coating, could be mentioned as of importance. The use of starches for these purposes, however, involves distinctive and separate consideration from the wet end application, and is mostly a matter of the special and peculiar characteristics of the various modified starches which have been made available for these purposes. The problems are those of suitable modification of the starches themselves and the general trend is towards a monodispersed or uniform breakdown in the converting operation.

As in the tub-sizing field, the possibilities of starch application in coating depend largely upon the inherent characteristics of the starch rather than upon the method of application. The large consumption of modified starch in the rapid machine-coating field is a notable advance in starch application. Brush coating mills are now showing a definite trend toward starch as the coating adhesive, a departure which has been greatly encouraged by the development of special starch modifications to give high strength and to influence favorably the flow properties of the coating color. In this field also the papermaker will generally await with interest the advances on the part of the starch technologists.

Using the Forest Crop

W. H. PRICE, Forester
Weyerhaeuser Timber Company

Men really began to use the forest crop of the Pacific Northwest in 1823 when a sawmill saw first bit into a Douglas fir log at Vancouver, Washington. The use of the companion trees of cedar, spruce and hemlock followed commercially as the decades rolled by.

Upon world-wide use of the Douglas fir forest crop a great industry has been built; an industry which gives employment to over 60 per cent of the industrial workers of the Pacific Northwest; an industry which furnishes the railroads with 67 per cent of their outbound freight traffic, which gives the steamships 80 per cent of all the freight they haul from this area; an industry which supports more than one-third of the entire population.

Into this industry has been poured the savings of many people—savings which have gone for research, to carry on experiments, to multiply the uses of wood fiber so that today there are over four thousand products of the forest available to the people of this continent.

When the Civil War was at its height in 1862, Congress passed the Morrill Act, introduced by Senator Morrill of Vermont.

Through this Act over 11,000,000 acres of land were appropriated to the states for "land grant" colleges. The states of Washington and Oregon together received 180,000 acres under the Morrill Act.

Fifty-two colleges have been established throughout the United States by this fund, among them Cornell, Masachusetts Institute of Technology, The University of California, University of Oregon, State College of Washington. The value of these institutions in 1928 was $427,000,000, and during the three-quarters of a century which has intervened since the Act was passed 400,000 degrees have been awarded by these institutions. From the original Morrill Act and subsequent acts, the State of Washington received a total of 2,800,000 acres. From the sale of timber and land to the amount of 500,000 acres the State of Washington has built up a permanent fund of $35,000,000, the interest on which goes towards the support of schools. The State still has 2,300,000 acres.

When the public domain was parceled out as an incentive to attract people into the far places for the settling of a continent, the emphasis was placed upon the quickest and best utilization of the land at that particular moment. Little or no thought was given to planning for future forest crops. The Northwest Land Survey System, originating in 1785, was designed to divide land into mile-square parcels regardless of topography, drainage or value. The Preemption Act of 1841, the Homestead Act of 1862, the Desert Land Act of 1877, and the Timber and Stone Act of 1878, all were designed to hurry up the settlement of the western country. Speed was the slogan—there was no time to think of long-range programs for timber utilization.

Under the Railroad Land Grants—really a help-settle-the-continent-subsidy—land was traded to the railroads, by the people through their government, in the form of alternate mile-square sections in strips 20 to 40 miles wide on each side of the right of way, in return for which the railroads were to extend their lines and thereby develop the country.

The railroads offered this land for sale for cash, and Frederick Weyerhaeuser and his associates were among the many purchasers. With the money realized from sales, the hard-up railroads completed their part of the bargain with the Federal Government by binding the west to the east with steel. A continent was united geographically and a nation began to flex its muscles.

Thus we see the owners of forest land multiplying in America—the Federal Government, the state government, the railroads and individual Americans with enterprise, initiative and vision.

Long-range planning of major industries, as we conceive it today, would have been ridiculous on the frontier.

In using the forest crop the private timber owner is confronted today with the problem of rearranging this patchwork ownership into an orderly tree farm that will supply a thousand men in a given town with permanent employment at the job of helping to furnish the American people continuously with forest products. Weyerhaeuser Timber Company has met this situation by cooperating with other private owners in the merging of forest lands into a common pattern so that the men and the management of already existing mills, and the communities which surround these mills, can look with greater confidence to a more secure future. This action has insured longer life for a number of towns in Western Washington. Much has been accomplished in this direction, but there is still a long way to go.

In the State of Washington 56 per cent of all the forest land is owned by public agencies, and if this complex problem of ownership is to be solved in the interests of all the people, cooperative arrangements must be made between public and private timberland owners.

Forest fires, insect ravages, windthrow, fungi and many other natural causes which have been going on for many centuries have

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made our virgin forests vary from tree to tree and from acre to acre so that the ownership pattern, while complicated, is nothing compared to this natural crazy-quilt.

Because of this varied condition of our forests, and because of the fact that the location of logging would inevitably move from the valleys to the steeper mountain slopes, it was found necessary early in the life of Weyerhaeuser Timber Company to make systematic inventories, to map the varied topography, and estimate the volume and grades of timber. In the early days the work of the cruiser was crude, his maps were rough, his estimates cursory and approximate. His work today is accurate, his topographic maps are of high engineering caliber.

We are conducting experiments today in various types of timber which will lead us towards more accurate methods of inventorying our stands to ascertain what quantities there are on our tree farm in the shape of shingles, lumber, pulp, plywood and fuel. On one area of approximately 1,200 acres of old-growth timber we have made a 100 per cent cruise and tagged each tree so that the individual logs can be followed through the manufacturing processes. The facts we derive from this experimental area will be used to increase the precision of our inventorying methods on many areas.

On another area of approximately 1,200 acres of second-growth Douglas fir we are carrying on experiments to arrive at the best forest practice in this type of timber.

On still another experimental area consisting of even-aged spruce and hemlock, we are selectively logging some of the trees. We will then study the remaining stand with a view to determining whether or not it is good business to apply this type of cutting to wider areas.

Harvesting our present crop of mature timber is but a part of a continuous cycle of cutting, of seeding, and of regrowing timber so that the men and the management of our company will be in a position to furnish society with uninterrupted supplies of forest products. The forester looks at a stand of timber not as something sacred to be preserved for posterity (although no citizen has a greater respect for and love of trees as trees than a forester), but he looks at it as an accumulation of many different grades and sizes of trees, each with two price tags—one tag upon which is written the value of the tree if logged today and the other tag its value if logged ten, fifteen, or fifty years hence.

All talk of sustained operations, roadside beauty, timber as a crop, renewable resources, is idle unless fire is kept away from all trees, young and old. Progress has been made in the prevention and suppression of fires, but there is still wide room for improvement.

No discussion of the use of the forest crop would be complete without some mention of the problem of taxation. The pressure of taxation upon owners of small tracts of timber to liquidate their holdings in short order is understandable. It should be emphasized that through this pressure process distressed owners are forced to salvage what they can from their investment. This is bad business all the way around.

The ingenuity of many experts has been challenged in trying to find an equitable taxation system because timber is a crop which takes not a year, but a century to ripen. I believe that it is perfectly fair to say that no signal which has yet come out of numerous huddles is the one that the whole team wishes to follow. However, it may be that reducing tax rates during the time the trees are growing and producing no immediate income for the owners, and raising the tax rates at the time the crop is harvested and producing immediate revenue, may be one way out. Every time we find a way of improving the forest taxation system

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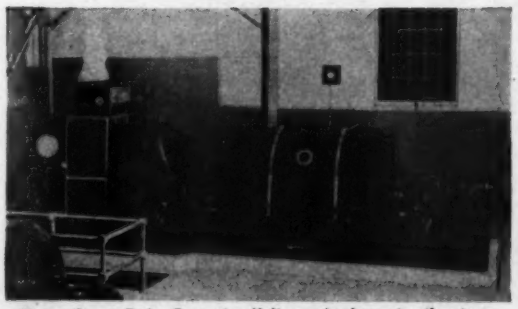

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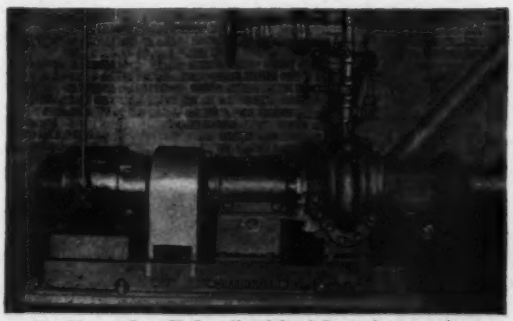

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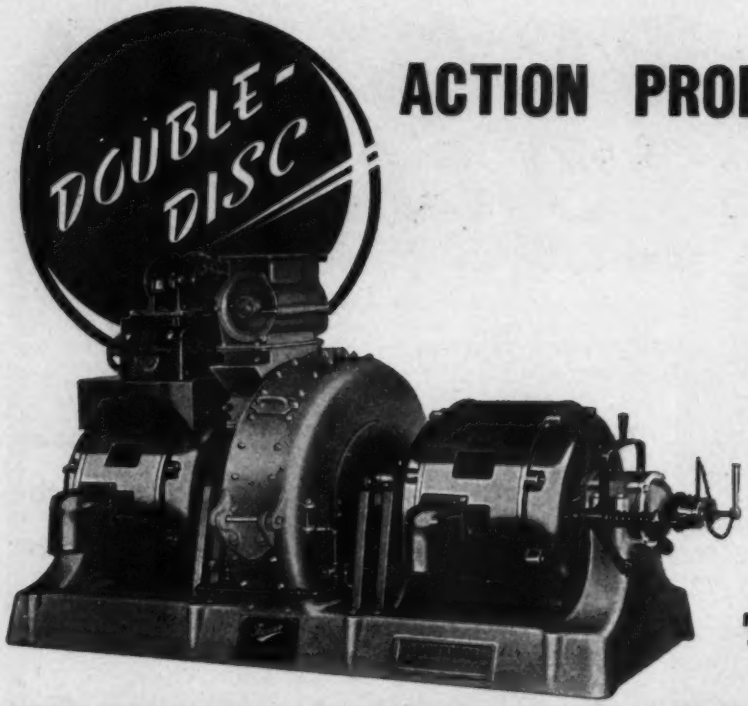

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Logs for the Longview mills are harvested on the slopes of Mt. St. Helens. These stands are approximately 70 per cent Douglas fir, 20 per cent West coast hemlock, and 10 per cent western red cedar. Logs are hauled by locomotive, 50 miles to the Columbia River where they are dumped, sorted and routed to the sawmills according to species, size and grade. The large fine-grained, soft, old-growth yellow fir logs are sawed in Mill 1, where high quality lumber is produced. Mill 2 manufactures the smaller type of Douglas fir logs which are admirably suited for such products as structural timber and framing lumber for house construction. Mill 3 is a very adaptable unit which saws cedar and hemlock logs. The cedar is used for the company's western red cedar exterior sidings and shingles. The hemlock logs, after a small percentage of the clear lumber has been removed, are broken down into cants or pieces which are conveyed to the pulp mill adjacent to Mill 3. The chips are conveyed on belt conveyors to the chip bin one-half mile away. This bin holds four days' supply and is so constructed that effective blending of the chips is accomplished before they are conveyed to the digesters. These chips are converted into bleached sulphite fiber by the usual chemical process.

The shingle mill has fourteen machines to saw shingles out of blocks cut from the red cedar logs produced in Mill 3.

Shavings planed off fir lumber are taken to the presto-log plant where they are compressed into fuel to be used for heating and cooking.

The life-work of the Weyerhaeuser Timber Company, men and the management, consists in growing, converting and selling the forest crop. There would be no point in growing successive crops of trees unless they could be converted, at a profit, into products which an over-widening circle of the American people would buy regularly. Today Weyerhaeuser Timber Company sells its forest products, with the exception of pulp, through a company, Weyerhaeuser Sales Company. This company was created for the purpose of rendering a service desired by the American people—furnishing uninterrupted supplies of forest products of qualities that meet their requirements and at prices which they can afford to pay.

The pulp division sells its own products through its own sales organization located at strategic points.

We are today endeavoring to use the forest crop as we find it. Confronted with multiple ownership; faced with widely variegated assortments of raw material; up against a national economy that permits foreign products to easily invade the home market, it has been no easy task to integrate the growing, converting and selling of forest products to the world.

Bark Burning Furnaces

C. A. HULSART, Sales Engineer
The Babcock & Wilcox Company

Waste wood is so variable in its chemical and physical properties that each wood-burning installation is an individual problem, and the properties of the fuel must be given individual study for each application. The characteristics of refuse wood are so variable that the general term—"waste wood"—is a misnomer, and some more general term, possibly "fibrous fuels," should be used.

On the Pacific Coast it is the general practice both to transport the logs and store them in water. This means that there is a higher percentage of moisture in this wood than is experienced when the wood is transported overland and stored dry. In addition, if salt water is the means of transportation and storage, considerable marine life accumulates on the logs, and the shells and other residue left by this form of life acts as a flux on the ash and cause very troublesome slag conditions both in the furnace and on the heat-absorbing surface. It is extremely important that this condition be given serious and active consideration, and equipment be designed accordingly.

In the Southeast, wood is generally transported dry. Therefore, the moisture content is generally much lower than when trans-

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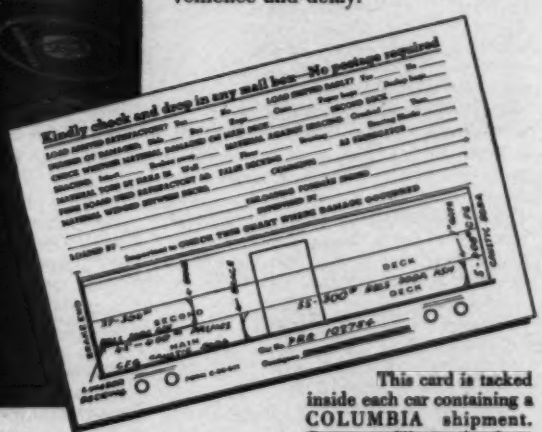

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ported by water. However, in this section, the timber grows in sandy land and there is considerable entrained sand in the bark. Therefore, provision for removal of as much sand as possible must be made in the design of the steam-generating equipment, as well as provision to eliminate the slagging of boiler heating surface caused by any sand remaining in the bark.

With hogged fuel from slab-removed bark, there is also a variation between the percentage of bark and wood. An analysis of representative samples of western hemlock showed the following ultimate analysis, taking these samples from specimens of all bark and specimens of all wood from the same sources:

	All Bark	All Wood
Carbon %	53.0	51.7
Hydrogen %	5.6	6.0
Sulphur %	Trace	Trace
Ash %	1.6	1.7
O + N %	39.8	40.6
B.t.u. per lb.	9550.	8880.

Northwestern hemlock and spruce contain a very small amount of essential oils, little of which is driven off in natural drying, probably a maximum of 0.2 per cent, as most of these oils are driven off only at temperatures that approach that of destructive distillation. These oils come under the general heading of "Oleo-Resins" and have a heat value of from 18,000 to 19,000 B.t.u.'s per lb. This would indicate that the phenomenon of combustible gases given off by a large fuel pile is probably due to fermentation or other chemical changes. There seems to be no reliable information available that would indicate any appreciable loss in B.t.u. value due to physical changes occurring while the wood is in storage.

Hemlock on prolonged soaking loses some of its tannin from the bark; otherwise there seems to be no appreciable change as a result of soaking. Tannin is lower in heat value than cellulose, and, therefore, any loss in tannin would indicate a slight increase in heat value per pound.

There has been considerable importance given to the possibility of drying wet wood fuels by utilizing the heat available in the stack gases. A superficial study of theoretical considerations might indicate that material savings could be made by the use of some form of practical equipment for drying wood by means of flue gases. However, a detailed study of the money value of the B.t.u.'s available in the flue gases of modern equipment indicates that there is a very little margin of profit available, and further indicates that the cost of equipment and operating expense must be low in order to show any reasonable profit.

Whether or not drying of the fuel is attempted in the spent flue gases, the air heater is an efficient and economical heat-absorbing unit and is probably necessary in cases where the fuel is dried by the flue gases, for the reason that the air heater will lower the temperature of the gases to below destructive distillation temperatures. If the flue gases in the neighborhood of 600 deg. Fahr. or over are permitted to come in contact with wood fuel, it is reasonable to believe that destructive distillation will take place among the fine particles of fuel and be the cause of considerable loss in heat value. This may be the cause of the high unaccounted-for losses usually experienced in tests on this type of fuel.

With wood and coal firing it is necessary that the wood be as completely burned as possible before the carryover particles enter the coal-burning furnace, in order to prevent slagging difficulties caused by the combination of wood and coal ash in the presence of high temperatures.

Little or no difficulty has been experienced with ash removal, with bark and coal firing, the ash being removed periodically to prevent any appreciable accumulation that would act as an insulator on the floor water-cooling surface.

Canadian spruce bark with as high as 75 per cent moisture has been handled satisfactorily for steam outputs of 45,000 lb. per hour, but is more difficult to handle than wood fuel of approximately 50 per cent moisture. Operating experience indicates that for fuel of 75 per cent moisture, the capacity on wood should be about 75 per cent of that for fuel of 50 per cent moisture, for comparative operating conditions.

In the South and East, wood fuel in the paper and pulp industry seldom is available in sufficient quantities to make more than a small quantity of the total steam required and, generally, one of the power boilers can handle all the refuse bark fuel produced as a by-product from wood preparation. This is not generally the case on the West Coast, as in this region there is an abundant supply of hogged fuel available from the lumbering industry.

This condition makes it economically obligatory to design steam-generating units so

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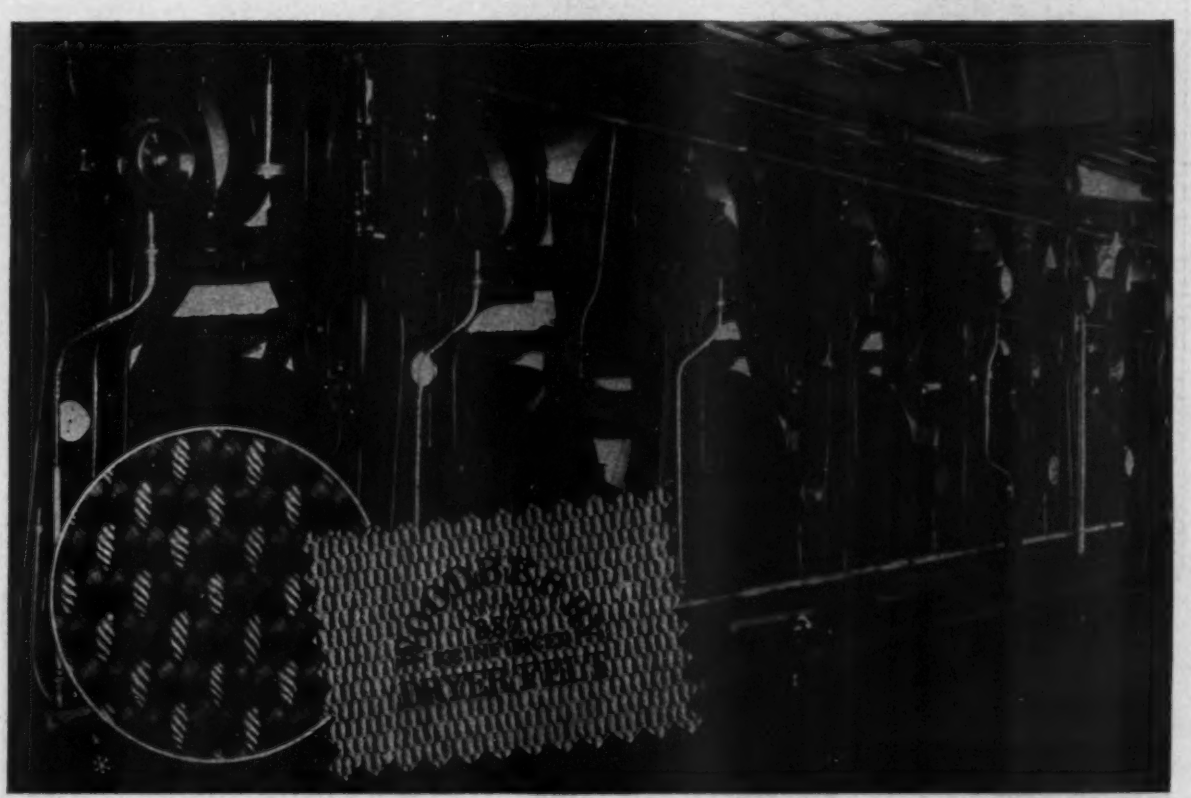

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that full capacity is obtainable with hogged fuel and emergency service only with oil fuel. As wood-burning furnaces are somewhat limited in capacity in the width of furnace rather than in depth, it is necessary to increase the total cell width by increasing the number of cells as the boiler capacity increases. This increase in width of furnace is much greater than the corresponding increase in boiler width, and so, to keep the boiler within a reasonable cost limit, the increase in heating surface is made by increasing the height of the boiler rather than the width.

The Interdependence of the West Coast Log Family

W. G. TILTON, Forest Engineer,

West Coast Lumbermen's Association and Pacific Northwest Loggers' Association

It is only in recent years that Douglas fir forestry has been focused, at least in a large way, on the markets for the forest products of the region. This is true to considerable degree of our West Coast loggers whose direct interests do not extend beyond the booms. Our loggers and foresters have been overwhelmingly concerned with the cutting of trees and the growing of trees, and have largely ignored the use and marketing of those trees.

Forestry in land use must be backed up by forestry in marketing and economics.

What I have to say on facts and figures of the forest situation in the Douglas fir region bears directly upon the market relationships of the region's forest products. For our sawtimber, our sawlogs, in the lumber field alone we need a varied and balanced market, a need unparalleled in any other lumber-producing region. No other commercial species has the range of uses enjoyed by Douglas fir. The lumber products of West Coast hemlock and of Western red cedar and Sitka spruce require special markets.

Maintaining a balance is a constant problem for the West Coast lumber industry.

We cannot log what we cannot sell. We cannot take forest material out of the woods for which there is no market. If we are to maintain timber-growing land and protect the timber crop so it may be harvested and used, we must have dependable diversified markets for *all* the products of the crop. We need to build up the principle of one great unified, balanced market for the products of the sawlog, the peeler log and the pulp log, as the major guiding principle of forestry for the Douglas fir region.

First, in order to get our terms on a common ground, I will give some conversion factors. The Scribner & Spalding scales that are used in timber in the Douglas fir region show a thousand board feet, log scale, yielding approximately a ton of chemical pulp. Six hundred billion board feet of merchantable timber—that is, trees over 16 in. in diameter—are standing in Western Washington and Oregon, on some 14 million acres of land. This timber is ready for use. The land is, for the most part, not active. It is, in effect, a 14-million-acre timber storehouse.

In the Douglas fir region of Western Washington and Oregon, we are cutting this timber at a rate of from eight to nine billion board feet a year. About six to seven billion

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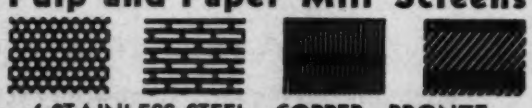

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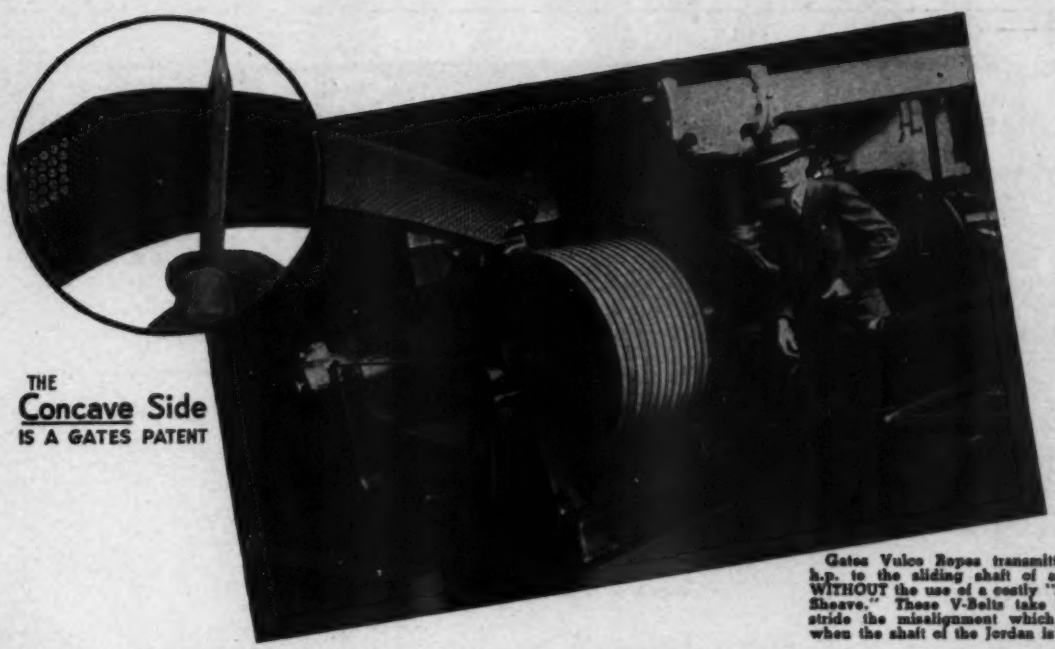

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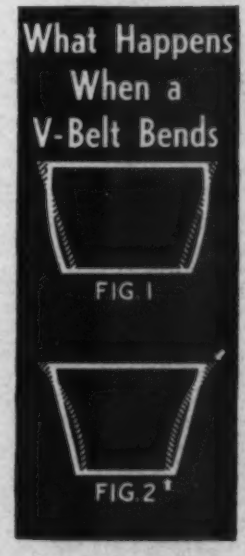
Now look at figure 2. There you see how the concave side of the Gates Vulco Rope (U. S. Patent 1,400,539) exactly corrects this bulging. It insures a perfect fit in the sheave groove with *uniform* side-wall wear and, therefore, *longer life!* It insures that the *entire* side-wall grips the pulley—heavier loads are carried without slippage—belts are *saved* and power consumption *reduced!*

The Gates Vulco Rope is the only V-belt built with the patented concave side.



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for lumber, a billion to a billion and a half for pulp, and another billion or so for plywood, shingles, fuel wood and other uses. These figures are nearly unbelievable when one considers that approximately one-third of the nation's timber is standing and nearly one-third of its forest products are cut in this little corner of the United States.

A look at the map will show our inland waterways.

Using a scale on the map, one will find that nearly all of the timber in the Douglas fir region is within fifty miles air-line from one or more of these waterways.

These waterways provide site facilities for the major wood-using industries of the region. On all of them there is cheap electrical power and good road and rail connections, and a diversity of wood-using plants such as pulp and paper mills, sawmills, shingle mills, plywood plants, furniture, box board, tub and bucket shops. Furthermore, these waterways provide fine handling facilities for forest products in the form of sawlogs, poles, piles, bolts or whatnot.

At very little expense the logs are unloaded into the waterways, sorted for use by species, size and grade and made into rafts that are scaled and valued. Here log rafts may be stored for months, if need be, available for inspection and purchase by buyers for the various wood-using industries.

With these inventories of logs available, each buyer may choose the particular species, grade or type of log desirable for his particular plant.

Industries on one waterway also supplement their log supply from one another. For example, high-grade fir logs are now being floated down the Willamette River from the center of western Oregon to the Columbia River and shipped from the Columbia River to Grays Harbor and Puget Sound by rail. Similarly, spruce, cedar and hemlock logs are shipped daily from Grays Harbor to Puget Sound. Many of our plants do control their own log supply, but most of these sell the products not suitable for their own plants and augment their own supplies from the open market.

Any kind of wood-using plant in the region with good dependable markets for its products can depend upon log supply from any area of the region. We have created here a real regional forest economy.

You've probably heard that we in the Douglas fir region are cutting timber four times as fast as it is growing. That is a worse distortion of fact than was ever made in a war communique.

With intensive forestry, the region will annually grow fourteen or fifteen billion board feet, or enough for at least a 50 per cent expansion. If the pulp technicians will help us by finding ways and means for using the thinnings from this growth, the expansion can be even greater.

Many of our forest areas will grow the wood to supply a ton of chemical pulp per acre per year, some acres two tons; or, the annual growth alone on a square mile will run a one-hundred-ton pulp mill a week; or on fifty square miles, for a year. That means that on some of our areas a one-hundred-ton pulp mill could be supplied perpetually from the forest growth within a five-mile radius; and there would still be 20,000 acres for farms and industrial use.

This growth is only a part of the story on supplies of raw material. When the eight or nine billion board feet is logged in the woods each year, enough wood is left behind for three million tons of cellulose. This material is not left because of any wish of our loggers to be destructive; it is left purely and simply because at the present time there is no market for this material. It is the timber that is partially defective and unsuitable for lumber manufacture; timber pieces too small to be economically handled; or logs of small diameter.

There is a job for you pulp and paper technicians—raw material for three million tons of pulp that may be had for the asking.

Why isn't the attempt made to use it? It has been tried. Pulp mills, fibreboard plants, barrel factories, charcoal burners, hog-fuel plants and other manufacturing plants have been designed to use this waste and the additional waste from our sawmills. Some have done so for a few years, but ultimately, all have found that our commercial logs, raw material in large sizes, can be handled so much more cheaply that even free wood waste is not attractive.

Here's a bit of another side of the picture. We are stuck here in the northwestern corner of the United States, two or three thousand miles by rail from the principal consuming markets of the country. Rail transportation at $16.00 a ton for lumber takes away a lot of our other advantages. Water transportation is good to California and some western markets; but it is 7,000 miles from here to the Atlantic Coast markets via the Panama Canal as compared to the 3,000 miles to the Baltic countries,

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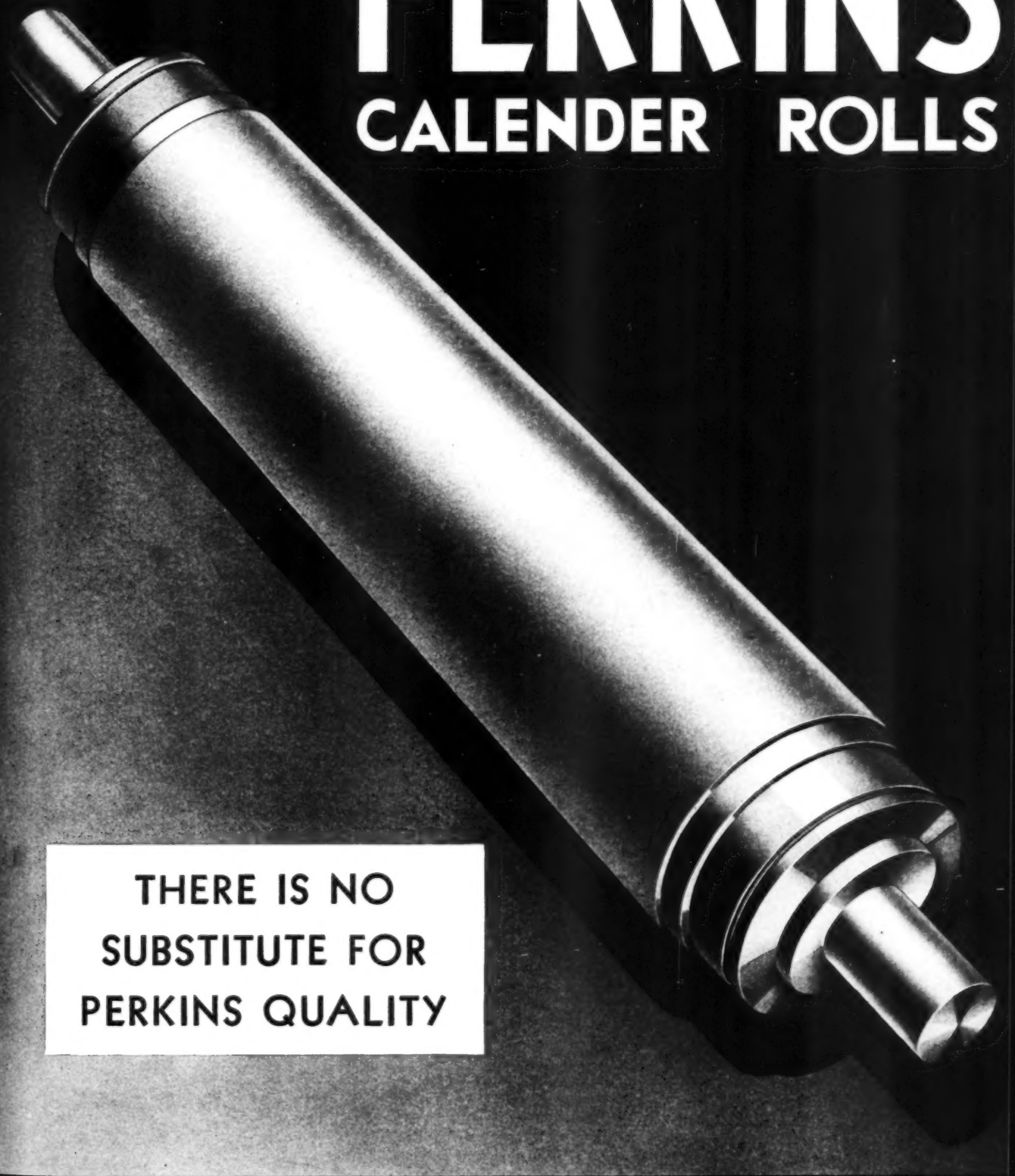

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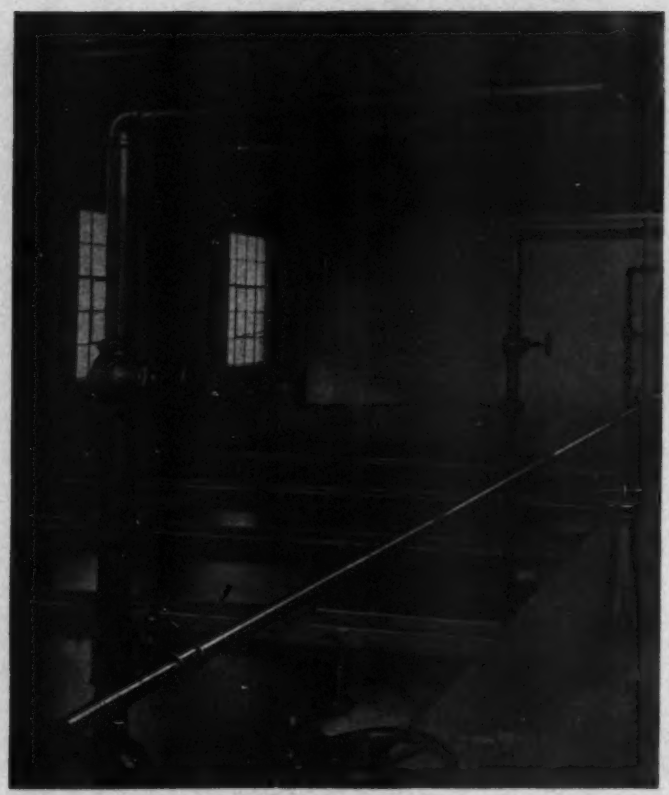

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against whom we have no tariff protection. Of course, we do not need this at the present time, due to war in Europe.

Our minimum wage in most of the Northwest woods is 62½ cents an hour, and the average is above 80 cents an hour. And labor is organized here. Labor in our own plants may be fully satisfied, but a strike among longshoremen, seamen, or some industry producing necessary equipment or materials, may close our plants for protracted periods and shut down our operations. Shutdowns are expensive.

There is also the ever-present fire danger. The tremendous amounts of inflammable material on our forest lands, plus the long dry spells that we have each summer, and the menace of a man with a match or a maid with a cigarette, or a spark from a berry-picker's pipe, creates a problem that is expensive and probably will not be solved for some time to come.

Those are just a few of the troubles that we have with us, but the biggest one is coming up. The hemlock and true firs grow mingled with the Douglas fir. Until now their logs have been produced as by-products of Douglas fir logging. Because they were a by-product, they have been available for pulp at a relatively cheap price.

It has been possible to get out hemlock by charging only the actual labor and material costs against it. This probably has been sound business for our loggers; but with our timber stands, particularly in the northern part of the region, showing a much higher percentage of hemlock, it soon will become economically impossible to consider hemlock as a by-product and it will have to stand on its own feet, or its own roots, which will mean a marked increase in raw material prices for this product.

There is also the possibility that as the percentage of Douglas fir in our timber stands declines, hemlock will come back into favor for lumber. It makes good lumber—is matchless in several uses—as a softwood flooring, for example. We used to sell more for lumber than is now being used for pulp.

In other regions a man alone, or a man and a mule, can get out pulp wood; but here where the pieces handled all weigh from one to ten tons and the ground all seems to stand on edge, a much bigger investment for equipment to obtain raw material supplies is necessary.

The raw material is here—enough hemlock and true fir to make 170 million tons of pulp—enough to run the pulp plants in this region for well over one hundred years. There is enough forest waste to more than double this tonnage; and probably will be for the next hundred years. After that, my guess is that there will be even more wood available for cellulose.

Yet most predictions, pro and con, on future forest depletion in the Douglas fir region are based on the assumption that present uses, markets and production in the region will remain unchanged. On this basis, such predictions are mostly pipe dreams.

But we do know that this region has the capacity to produce timber to meet any future needs that can now be practically conceived. And we do know that all the forest industries of the region have a unity of interest in forest markets, an interdependence in the balanced use and purchase by the American people of all the things that can be made from the harvest of the West Coast timber crop.

Abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 19-22, 1940, appeared in the March, April, May, June and July issues. Another installment of these abridgments is given this month.

The Function of pH In Water Treatment

C. E. IMHOFF
Feedwater Treating Department
Allis-Chalmers Manufacturing Co.

If water chemists were asked to list in the order of importance the ions commonly found in water, the hydrogen ion would invariably head the list.

As an example of what *p*H may reveal, consider a water having a *p*H value of 9.0. The following can be inferred concerning the character of the water:

1) It is probably non-corrosive.
2) It may be a partially softened water.
3) It is not a typical boiler water.
4) It contains no free carbon dioxide.
5) It is not a raw water.
6) It is probably not a condensate sample.

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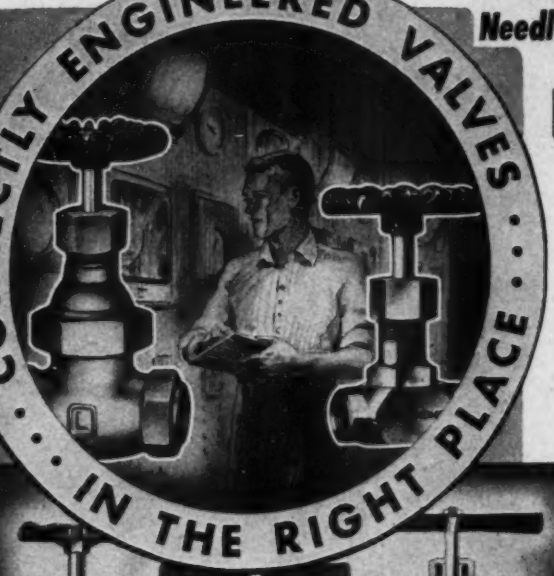

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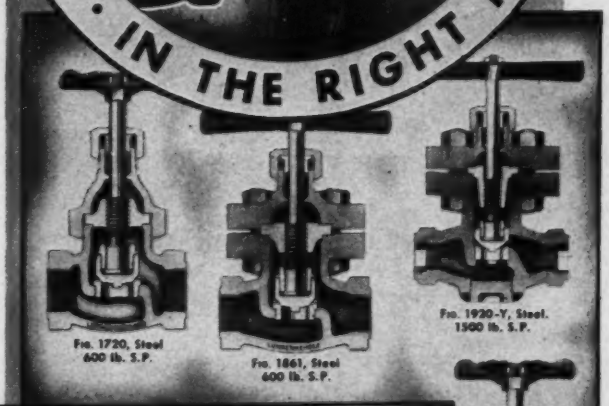

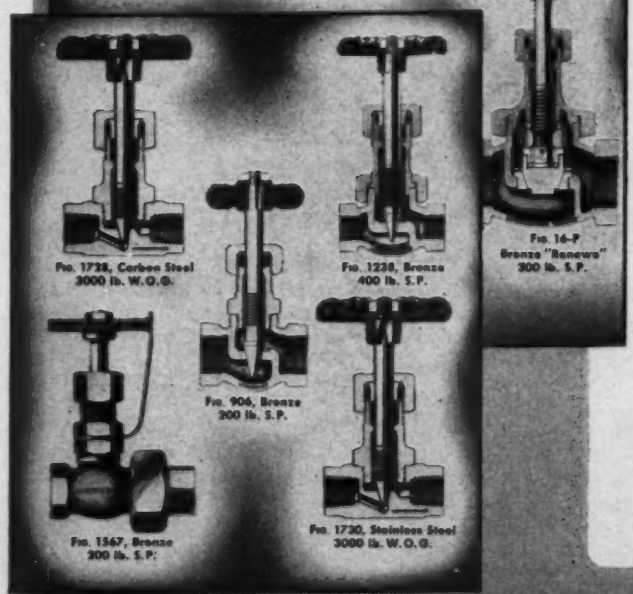

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7) It is probably saturated with respect to calcium carbonate and will not undergo heating without precipitation of calcium carbonate.

No single determination alone will give as much information as that of the hydrogen ion concentration.

The influence of the hydrogen ion in feedwater and steam cycles is restricted mainly to two general types of phenomena. They are: (1) Influence on the solubility of various compounds; (2) Influence on corrosion.

Baylis [Baylis, J. R. *Ind. Eng. Chem.* 20, 1191—4 (1920)] was one of the first to emphasize the importance of *p*H control in the precipitation of calcium and magnesium in cold process softening.

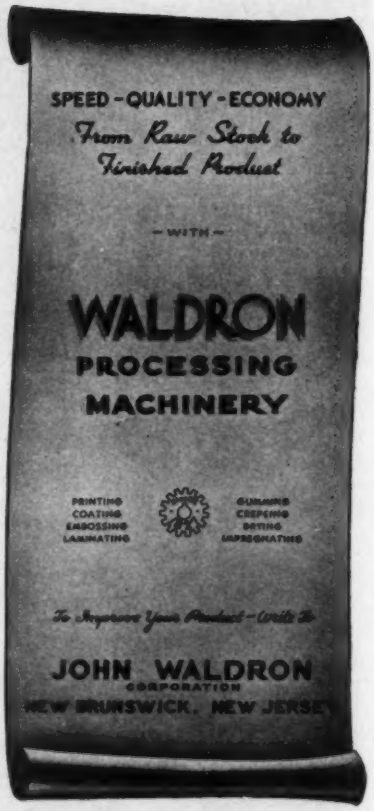
In softening reactions the *p*H value is adjusted to produce a maximum amount of precipitatoin of calcium and magnesium. The adjustment of *p*H value may also be used to prevent the precipitation of calcium and magnesium where these precipitates are undesirable.

Undesirable calcium carbonate deposits are usually found in heat exchangers or condensers where the calcium carbonate content in the water is near the saturation value. These may be prevented by the use of small amounts of acid. Sulphuric is most commonly used since it is cheapest for industrial use. Carbonic acid is very widely used when a carbon dioxide generator is available. The amounts of acid used in most cases do not exceed several parts per million but require a means of feeding which is fairly uniform. In the acid treatment of condenser cooling water, the acid is admitted at the suction of the circulating pump. It is quite necessary that the acid be added in a closed system so that no dissolved carbon dioxide will be lost through escape to the air.

The influence of dissolved carbon dioxide in keeping the *p*H value down is quite marked and can be illustrated by reference to a number of different types of water which have undergone either aeration or deaeration, in which case there is an appreciable loss of carbon dioxide, accompanied by a rise in *p*H value. The accompanying table shows some typical examples taken from actual operating conditions.

Calcium phosphate is another compound of calcium whose solubility it is important to control. In boilers and softeners the calcium phosphate must be as insoluble as possible. The *p*H value of boiler water is usually around 11, assuring a minimum solubility.

The application of phosphate in external softeners is limited to waters of low hardness. The primary phosphate softener is used with di-sodium or tri-sodium phosphate and caustic soda. A coagulant is also helpful especially if the water contains organic matter. A common use of the phosphate softener is in series with a lime-soda softener. When used in this manner it is called a secondary phosphate softener. The lime-soda softener reduces the hardness to about one grain per gallon, after which the hardness is reduced to zero in the phosphate softener. Proper control of the *p*H value is very important if complete removal of calcium phosphate sludge is accomplished in the softener.



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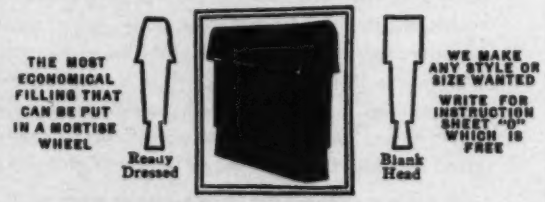
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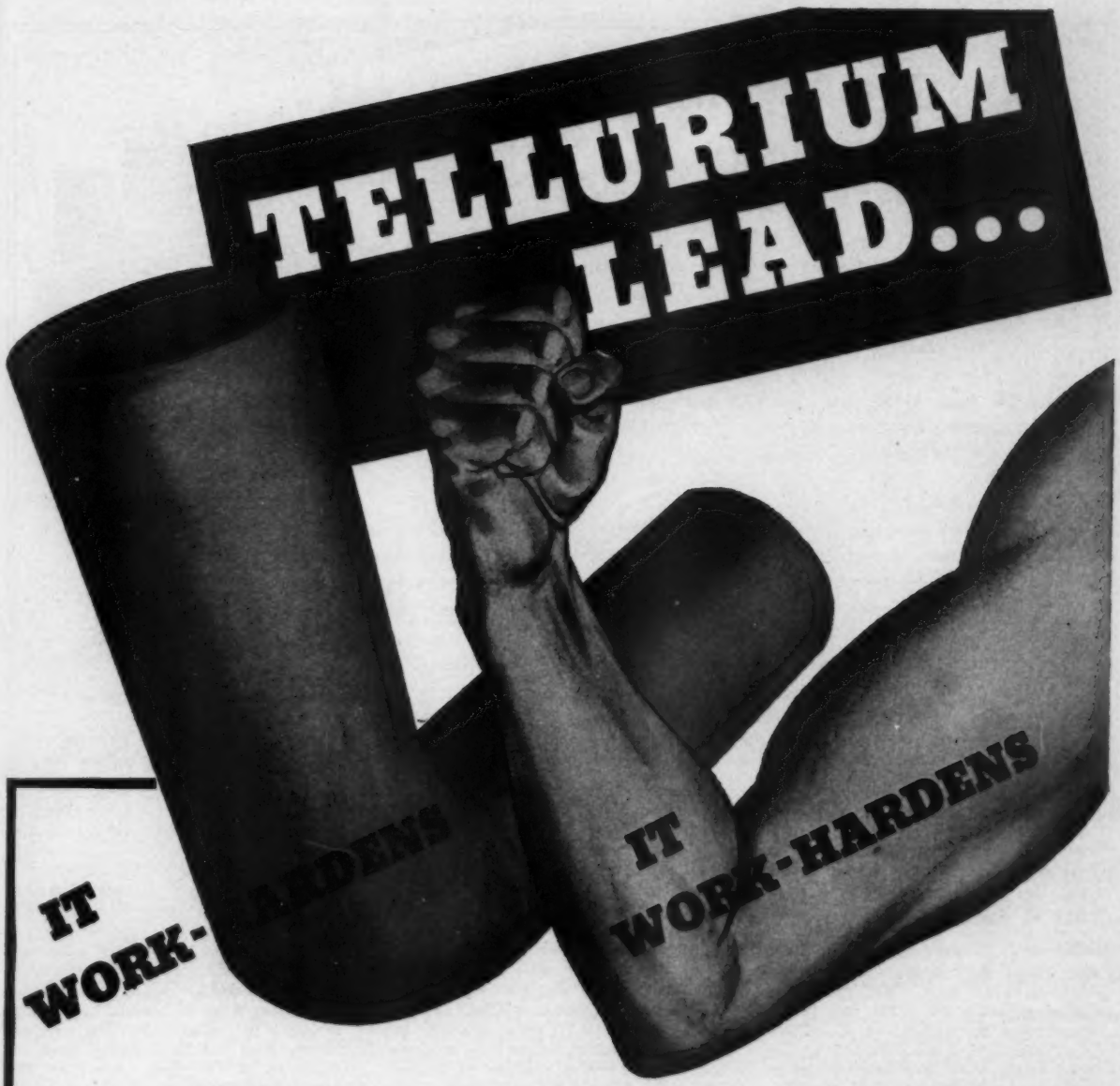

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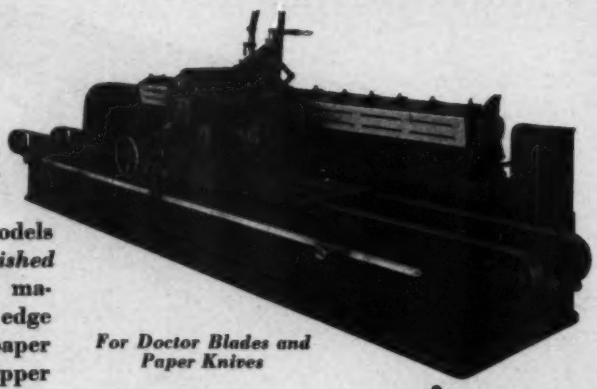

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The *promise* in the earlier design of the models here shown, has now become the *established standard* in the latest development of these machines, for strictly precision grinding, keen edge finish, wet or dry grinding of slitter knives, paper knives, doctor blades, barker knives, chipper knives, and all straight or bevel edge grinding, and universal slitter knife service.

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Superior, *proved*, service was never better exemplified than in these two machines, definitely establishing the better grinding standards for slitter knives, paper knives and doctor blades, which are now becoming the standards of the industry through the development and wide adoption of these machines.

Superior, economical, proved. Developed by the pioneers in the industry. Complete catalogue sent free upon request.

For Slitter Knives

COVEL-HANCHETT CO.—Big Rapids, Mich., U.S.A.

When the effluent of a phosphate softener containing excess phosphate mixes with condensate returns in the heater, the mixture will contain both soluble phosphate and hardness if the condensate is in any way contaminated with raw water. In such cases it is necessary to take precautions against the precipitation of calcium phosphate in feed lines, closed heaters, and regulating valves. The *p*H may be decreased below the solubility value and both the soluble calcium and phosphate are admitted to the boiler without precipitation. Inside the boiler, however, *p*H conditions are much different than in the feed line, and calcium phosphate precipitates out immediately. The use of sufficient sulphuric acid to lower the *p*H below 8.5 is sufficient to prevent difficulty from phosphate deposits. The minimum *p*H value for prevention will vary with conditions depending upon the total hardness of the softened water, the percentage and quality of condensate returned and the total temperature attained by the feedwater before entering the boiler.

The elimination of certain impurities from water can be accomplished only by adsorption on surfaces. These impurities may be oil, colloidal suspended matter, color and dissolved silica. The material on which it is adsorbed is the coagulant. The adsorption phenomenon depends upon several factors such as: (1) Insolubility of coagulating agent; (2) Chemical nature of both the impurity and the coagulant. Both of these factors may be influenced by *p*H value. The most common coagulants are the salts of iron and aluminum. Excessively high or excessively low *p*H values may cause the coagulant to entirely soluble and under these conditions, of course, there can be no absorption since there is no surface present. The *p*H value will also affect purification by changing the nature of the impurity. It will have a greater or less affinity for the adsorbent and the ease with which it can be removed will thus be affected.

The purpose of the siliceous zeolite softener is to exchange sodium ions for calcium ions. In the zeolite softener the accumulated stock of calcium and megnesium ions are exchanged for a new stock of sodium ions by passing a solution high in sodium ion concentration through the softener. This is the regeneration process. The cheapest source of sodium ions is from salt brine and it is universally used for regeneration on the sodium cycle. One of the disadvantages of this exchange was that when the calcium and magnesium in the original water existed as the bicarbonates, the sodium in the softener effluent was the bicarbonate. When used for boiler feed purposes, the sodium bicarbonate broke down to form caustic soda and difficulties were experienced in the form of carry-over and caustic embrittlement. The use of sulphuric acid in conjunction with the zeolite softener was developed and as a result many of these difficulties were corrected. Industrial experience also showed that if the water was acid treated and then thoroughly aerated before softening, the alkalinity was reduced by the amount of acid added. The aeration had reduced the hydrogen ion concentration by removing the carbonic acid.

Heheman and Gustafson [Beheman, A. S. and Gustafson, H. *Ind. Engr. Chem.* 28, 1279-1282 (1936)] studied the effect of hydrogen ions on zeolites between the values of 7.8 and 4.3. Below 4.3 the hydrogen ions concentration becomes great enough to affect the stability of the zeolite structure. When the water contains free carbon dioxide, the degree to which hydrogen ions are exchanged for sodium can be measured by taking pH values before and after softening. King and Smith [King, R. E. and Smith, O. M. *Ind. Eng. Chem.* 31, 727-8 (1939)] used this method of studying the reactions of carbonic acid in a zeolite softener. The effect of weakly acid solutions on the perfôrmance of a zeolite are noticeable between the *p*H values of 6.8 and 4.5. The total capacity for calcium and magnesium is considerably less than in water of the same harness but with higher *p*H value.

Most of the natural green sand zeolites will withstand operation on low *p*H waters with no harmful effects. There is the possibility, however, of minor destructive action on synthetic zeolite during the process of regeneration.

The use of a high *p*H water through a zeolite will result in softening of the bed and slow disintegration. Soluble silica will be dissolved and carried on into the boiler and there will be a loss of mineral. In plants where zeolite softening is to follow a lime treatment, sulphuric acid is used to bring the *p*H value down to 8 before passing through the bed.

The new carbonaceous zeolite, described by Tiger [Tiger, H. S. *Trans. A.S.M.E.* May 1938, p. 315-25] besides being non-sili-

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ceous, is different from the ordinary zeolite in that it has an enormous capacity for hydrogen. It is regenerated with acid and readily exchanges hydrogen ions for calcium, magnesium and sodium. This is a very important property since it makes possible the complete removal of bicarbonates by converting them to carbonic acid. The carbonic acid is removed by aeration.

Much has been written about the corrosion of iron and steel and many mechanisms have been suggested. Regardless of exact mechanism, however, the facts seem to bear out the contention that the "rate" of corrosion (in steam and feedwater systems) is a function of the *p*H value and the "amount" of corrosion is a function of the dissolved oxygen content.

A high *p*H value retards corrosion since there is present such an extremely small amount of hydrogen ions for reaction and conditions are very favorable for the formation of impervious iron oxide coatings.

The technique for the measurement of the hydrogen ion concentration is not much more than 35 years old. Modern improvements have advanced so far that the determination of the hydrogen ion can probably be made with more accuracy than that of any other ion normally present in water. For routine work the colorimetric method is sufficiently accurate. The use of the glass electrode, however, is becoming very popular and if properly used, it is capable of great accuracy. Most *p*H recorders on the market use the glass electrode.

Chemicals used to reduce the *p*H value include sulphuric acid, muriatic acid, alum and carbonic acid. If a process involves the use of alkaline chemicals it is often possible to reduce the *p*H value by a reduction in the amounts of alkaline material used. It should be remembered that the above mentioned chemicals cannot be used indiscriminately without regard for their effects other than influence on *p*H. For example, sodium silicate should not be used to raise the *p*H of boiler feedwater because of the detrimental effects of the silica added to the boiler.

Power plant problems capable of solution by *p*H control include:

1) The prevention of calcium carbonate deposits in feed lines, condensers and heat exchangers.
2) Attainment of maximum softening efficiency from lime-soda and phosphate softeners.
3) The prevention of calcium phosphate in feed lines, closed heaters and regulating valves.
4) The most efficient removal of impurities involving coagulation.
5) The protection of zeolite mineral from aggressive water.
6) The elimination of corrosion.

Increase in pH resulting from loss of carbon dioxide

Type of Sample	Type of Decarbonator	pH before	pH after
Well Water	Sprays of Cooling Pond	7.3	8.5
Condensate	Deaerating Heater	5.5	6.8
Steam	Deaerating Condenser	6.0	6.8
Boiler Feed	Deaerating Heater	7.1	8.2
Hydrogen Zeolite	Aeration Tower	4.5	6.5

The Use of Spectrophotometry on Coated Paper

WILLIAM J. FOOTE.
Consolidated Water Power & Paper Co.

Until the consumer purchases his paper on the basis of physical specifications, there will be confusion between manufacturer and user due to a lack of a common color terminology, variation in individual sensitivity, and confusion of chromaticity with whiteness. When it is remembered that there are hundreds of thousands of perceptibly different colors, that several individuals may have several differing sensations evoked by the same stimulus, and that an individual's conception of a color (as well as the material standard itself) may vary from day to day, the need for a strictly reproducible method of color evaluation and specification is amply proven.

In the field of light weight coatings, there are two color matching problems. There is, first, the matter of matching the coating color with the color of the base stock, and, second, the problem of matching the standard color for a given grade or of matching submitted samples in establishing new grades. When it is considered that the ap-

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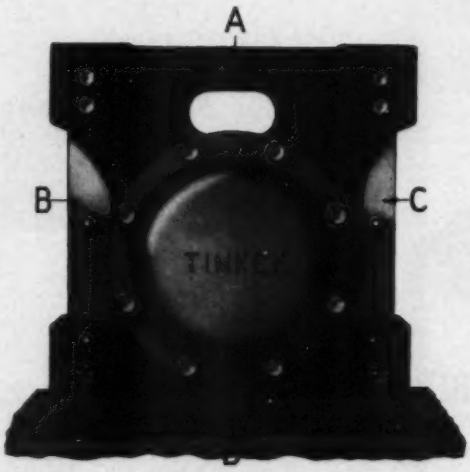

FIG. 1

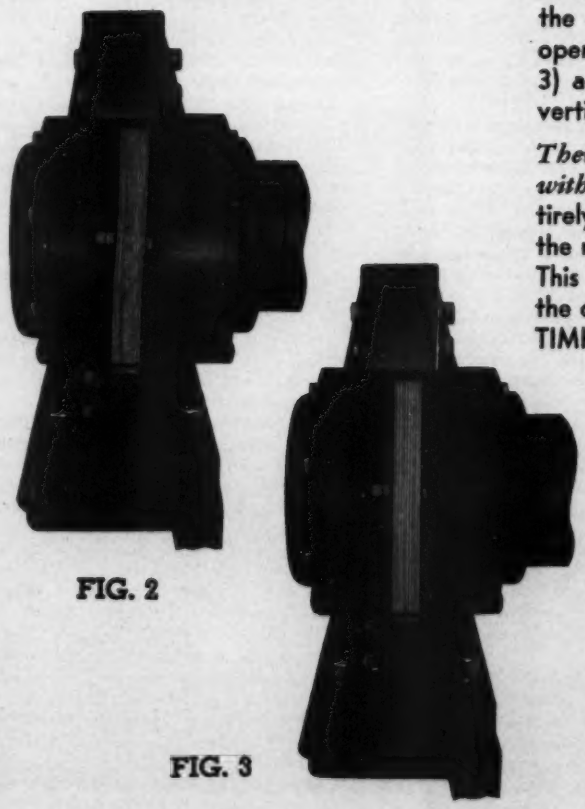

FIG. 2

FIG. 3

Dryer roll expansion and deflection in paper machines has caused a tremendous amount of trouble in the past, but there is no need for you or any other paper mill operator to endure it any longer.

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The new mounting (Figure 1) consists essentially of a bearing box or housing A, carried upon two laminated springs B and C, which in turn are rigidly secured to a heavy base D, bolted to the main frame of the dryer. The mounting is so designed that when the machine is cold the springs sag inwards slightly, (Figure 2) the amount of the sag corresponding to the maximum expansion of the dryer rolls under heat. Thus, when the dryer is in operation the springs assume an erect position, (Figure 3) acting as columns and assuring ample support for vertical loads.

There is no lateral movement of any bearing member within the bearing housing. Roll expansion is taken entirely—and surely—by the movement of the springs, and the rolls constantly are maintained in correct alignment. This mounting is used only on the front of the machine, the drive end of the rolls being supported by a standard TIMKEN Bearing mounted in a self-aligning box.

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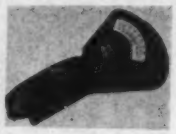

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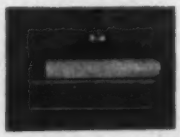

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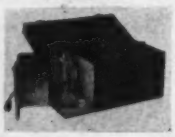

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proximate thickness of a 15 lb. coating is .0005 on either side, it can be seen that unless the pigment is one of high refractive index, the coating will not be optically opaque. In fact, until the basis weight reaches the vicinity of 85 to 90 lb. per ream (25x38-500), the entire sheet will be translucent. The usual printing weights range from 40 to 60 lb. per ream. Therefore, it is essential that a reasonably close match be obtained between coating and raw stock.

For the purpose of matching the standard color, the spectral reflectivity curve will be of the most practical value. Its measurement is rapid enough to permit its use as a control test. When the spectral reflectivity curves of two samples are identical, the two will match for any observer under any type of illumination (assuming the same geometry of viewing). There is the possibility of two curves differing so slightly that they will match under one light source but not under another. This will be particularly true if it is necessary to match a sample using different dyestuffs than were used originally.

If the two curves do not coincide, it is necessary to provide some criterion by which the color man can judge whether the match is acceptable or not. It is generally accepted that the eye is capable of distinguishing between brightness differences of about 2 per cent of the reflectivity value. When the curves are the same at both ends of the spectrum, it is generally a simple matter of adjustment of the proper quantity of dye to make the match.

The method of utilizing chromaticity data for color matching has been described in a previous paper [Foote, W. J., *Paper Trade J.*, 108, No. 10:125-33 (Mar. 9, 1939)]. Necessary information includes the chromaticity data on various weight dyeings of each dyestuff alone and enough combinations to permit the drawing of contour lines for constant total weight dye and for constant ratio of first and second dyes.

On the basis of information of this type, it is possible to specify very closely the formulas of available dyestuffs for matching the sample. It is to be stressed that the visual efficiencies resulting from various combinations of dyes must be watched as closely as chromaticity. Often, a combination of dyes yielding contour lines immediately surrounding the point specifying the color of the sample on the chromaticity diagram will permit a chromaticity match but not a visual efficiency match. The accumulated data (and it is here necessary to point out that this data must be collected in each mill due to slight differences in pulp quality) will permit selection of dyes which will yield a match in both chromaticity and visual efficiency. If the trichromatic coefficients (and, as a result, dominant wave length and purity) are identical, and the visual efficiencies of sample and match the same, the paper made will be a match under the particular illuminant by which these figures were calculated, irrespective of the coincidence or non-coincidence of the respective spectral reflectivity curves.

Since the mineral pigments used in coating are usually considerably brighter than the fibers making up the base sheet, there is, in effect, a dilution with white upon coating. A blackening follows supercalendering.

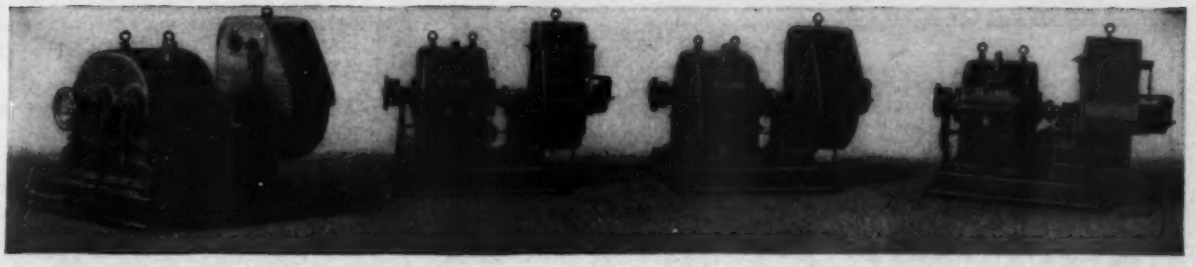
The obvious results of supercalendering are smoothing of the paper, development of gloss, decrease of opacity and visual efficiency. The decrease in opacity of the supered sheet is relatively greater than that of the coated sheet.

The amount by which the blackening may be limited depends upon other than colorimetric criteria. Printing quality with its inter-relation of ink absorptivity, smoothness, gloss, and opacity is naturally the major aim. Within limits, printing quality may be balanced against color as it is affected by the supercalenders. The balance also depends to a large extent upon the type of materials being used.

Whether physical printing properties of paper may be sacrificed to a slight extent to produce a more "pleasing" color throws the question directly into the field of psychological interpretation.

Paper may vary from whiteness either chromatically or achromatically. The chromatic differential can best be measured on the *ICI* chromaticity diagram although the least perceptible differences will be of varying linear magnitude in different portions of the diagram. Judd's Uniform Chromaticity Scale triangle [Judd, D. B., *J. Research Nat'l. Bur. Standards*, 14: 41-57 (1935)], a transformation of the *ICI* diagram in which uniform distances represent equal chromatic variations, is applicable to the case of paper color especially when interpreting whiteness as a single number on the basis of MacAdam's formula [MacAdam, D. L., *J. Optical Soc. Am.*, 24:188-91 (1934)].

Although light measurements are ex-



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meet such requirements in an ideal way. Speed reduction permits both turbine and driven machine to run at the speeds respectively most conducive to efficiency.

The speed of the turbine can be adjusted, either manually or automatically, by continuous variation through a wide range, resulting in a great saving of power as compared with throttling the air flow, and also giving better control.

The large powers now required by draft fans, often exceeding 1000 hp., enable turbine drive to compete in economy with motor drive, if the latter is charged with its proper share of electrical losses and equipment costs.

Finally, turbine drive, besides being more flexible and in many cases less expensive than electrical drive, is VASTLY MORE RELIABLE, since it is independent of main units and electrical circuits, and so long as there is steam pressure, is always ready to run.

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tremely accurate, specifications of brightness or whiteness which are based on the standard observer will not always correlate with visual judgments. Variations in the sensitivity of different individuals is an acknowledged fact. Some people will prefer a reddish white to a blue white. By prefer is meant that if they are given two sheets of equal brightness (*GERM*), one of reddish and one of bluish hue, they will judge the reddish one to be the brighter. The majority of color graders, however, will prefer the blue white although the visual efficiency of a blue white must be less than that of a red white of equal brightness (*GERM*). The blue white will approach more closely to the spectral reflectivity of magnesium oxide, and as such will be whiter.

Lewis [Lewis, L. C., *Paper Trade J.*, 103, No. 22:43-50 (Nov. 26, 1936)] published an interesting example of the color changes undergone by the paper used in a nationally distributed magazine. One mill offers the publisher a sheet more heavily dyed with blue, for instance. The publisher likes its appearance and all the other mills supplying him have to change to the new color. This cycle may occur as often as once a year with some publishers. Unfortunately, each publisher may prefer a slightly different color —and get what he wants, the customer always being right. For that reason, it is improbable that there will ever be an optimum hue for white printing papers. Undoubtedly, physicists could balance minimum chromaticity against maximum visual efficiency for any given furnish. But until paper is purchased on physical specification of color, they will always be stymied by subjective judgments, and even thereafter will still have to contend with the problem of which is the optimum color.

The "Velo" Cold Set Process of Printing and Its Relationship to the Paper

FRANK G. BREYER, Singmaster & Breyer

Cold set printing is the process of drying ink by freezing instead of by absorption, evaporation, oxidation or polymerization. All inks when dry on the paper are solid mixtures of color and binder.

In the cold set process the fluidity of the ink necessary to feed it properly from the fountain to the relief surfaces is realized simply by melting the solid finally wanted as a deposit on the paper. The fountain, the ink carriage steels and the plate cylinder are all heated by hot water from within. This keeps the normally solid ink fluid and controllable. When the hot ink touches the cold paper (that is, cold as compared with the temperature of the ink) it freezes or solidifies without penetration and remains as a solid deposit in relief on the top of the fibers.

The foregoing is a fair statement of what cold set printing is, and obviously it makes very little difference what kind of surface you print on. The fibers may be loose or tight. They may be uncoated or coated. The cold set ink from a half tone dot, for example, always sits on top of the fibers or coating in sharp relief right where it was deposited. There is no lateral spread or vertical penetration due to fiber suction as with liquid inks.

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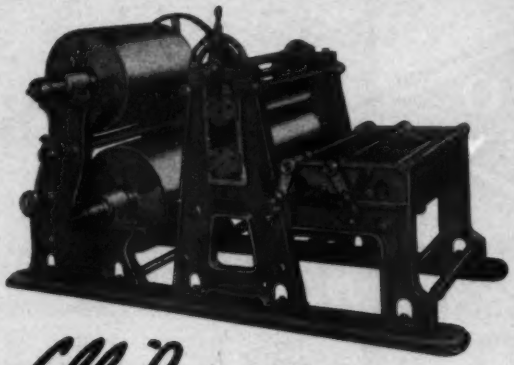

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551 Fifth Avenue, New York City

You gentlemen know better than I do what has been done and what it has cost to keep liquid ink from penetrating absorbent paper. With cold set ink the limitation on thinners becomes one of strength and opacity only. Present titanium coated or filled manifold or airmail paper already indicates the direction in which the papermaker may go in meeting this specific requirement, as he is now freed from the limitations of penetrating liquid ink.

While it is true that cold set ink does not penetrate as normally applied, if for any reason penetration is desired, all that is necessary is to heat the paper after printing. The ink then becomes liquid, the normal suction of the paper operates and there is penetration. The simplest way to get this effect, if it is desired, is to run the paper after each impression over a steam or hot water cylinder.

Low pick test coated stock holds little terror for this process. With little tendency to fill-in we are able to print on ordinary newsprint with 133 screen and retain the sharpness of outline and absence of fill-in characteristic of much higher grade paper. Of course, we get better results with better paper. The difference, however, between the old and the new process is sharper on the more porous stocks.

Inasmuch as the cold of the paper is the setting agent, the faster the paper goes through the press, the greater is the setting effect. The only limitations on speed of the commercial presses that we have operated with so far are mechanical and inherent in the machine itself.

Another consequence is that since there is no wet ink to smear or offset, no blotting paper (offset webs) or offset compounds are needed.

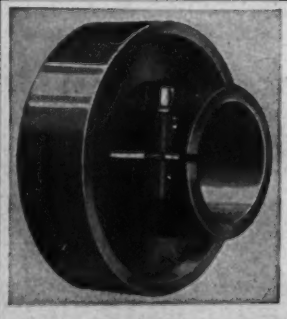
Up to the present time the ink has been furnished only in a solid mass in regular ink containers, from which it is broken out with a hammer. When broken up, a bucketful of black ink looks like a bucket of coal. The ability to package and handle the ink in solid pieces of a specified weight has important advantages to the printer.

Where it is desired for any reason to work at temperatures above 212 deg. Fahr., glycerine, Dowtherm or other liquid heat transfer medium may be used instead of water. Since to melt a pound of ink and raise it to 212 deg. Fahr. requires about 150 B.t.u., the heat actually carried by the ink to the paper when printing with 50 pounds of ink to a ton of paper is only 7,500 B.t.u. per ton of paper, or less than 4 B.t.u. per pound of paper. If no heat were dissipated, this would raise the temperature of the paper only 10 deg. Fahr. Actually, of course, most of this heat is immediately lost as the paper moves through the press, so that the real temperature rise in the paper is hardly measurable.

An important consideration in connection with cold set printing is the fact that practically all types of presently operating web presses can be readily converted to this process of printing. With the exception of hot water connections to the shafts and fountain, there is no other outward change of the press and the operation is the same as with regular ink except that the offset mechanism is eliminated. Further, if for any reason it is desired to print with the regular letter press inks, this can be done simply by turning off the heat.

The basic idea of setting ink by cold instead of heat came from Walter Huber, president of J. M. Huber, Inc., and the guiding spirit behind the process. It is by his permission that this paper is given at this time. The John Waldron Corporation, of New Brunswick, New Jersey, and in particular, Mr. Lynn Case, the vice president and general manager, has not only contributed basic ideas on the apparatus design, but general encouragement and sound common sense judgment on many matters pertaining to the process. The co-operation of the Art Color Printing Company at Dunellen and its entire personnel has been of the highest. The vision, faithfulness and persistence of the research staff of J. M. Huber, Inc. and in particular, Lothian W. Burgess in charge of this cold set division, must be credited with a high score. I take particular pleasure in acknowledging the thoroughly practical and always to the point advice and help of our master printer, Eddie O'Hara of N. Y. No. 51 I. P. P. of A. U.

EDITOR'S NOTE: Publication of abridgments of papers presented at the annual meeting of the Superintendents Association held in Cincinnati, Ohio, June 18, 19 and 20, will be continued in the next issue. Previous installments of these abridgments have appeard in the July and August issues.



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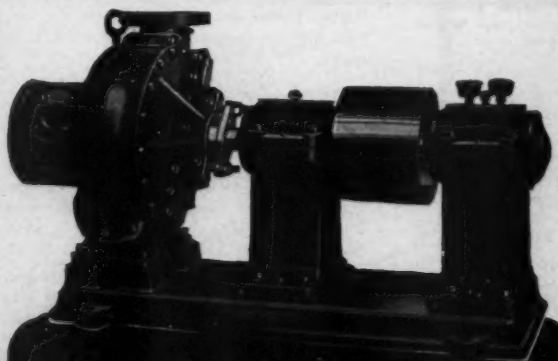

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NEW EQUIPMENT AND SUPPLIES

Call Timer

Holcomb & Swenarton, 92 Liberty Street, New York, N. Y., has developed a device, known as the *Tele-trol*, for indicating the time consumed in individual long distance telephone and teletype calls. A touch of a lever starts the device; and a warning bell rings automatically 20 seconds

before the three minute period elapses. The device is equipped with a white enameled dial with raised chromium numerals. The numerals cover a six minute period. By returning the indicator to zero just before a six minute period expires, the device can be used to time a call of any duration.

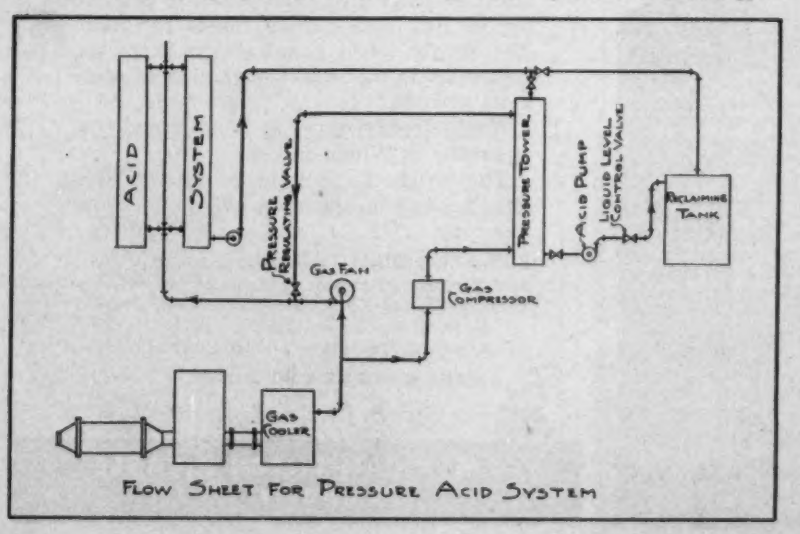
Pressure Acid System

A pressure acid system, developed by R. B. Wolf and the G. D. Jenssen Co. for use in the production of cooking acid for sulphite mills, has been announced by G. D. Jenssen Co., 103 Park Avenue, New York. The system consists of a gas compressor and a vertically-arranged cylindrical pressure tower which is tied in to a standard Jenssen acid system ahead of the reclaiming tank. The tie in is made through a pipe line arrangement designed to permit acid from the acid system to enter at the top of the pressure tower or to be by-passed to the reclaiming tank; and to permit SO_2 gas from the gas cooler to be compressed and the compressed gas to enter at the bottom of the pressure tower, the gas pressure in the tower being controlled through a pressure regulating valve located in a line that connects the top of the pressure tower with the SO_2 line between the gas fan and the towers of the acid system proper. Acid from the pressure tower is pumped to the reclaiming tank, the acid being discharged from the bottom of the pressure tower and delivered to the top of the reclaiming tank.

The pressure tower has a chemical ring packing. The compressor is of chrome nickel steel.

By varying the pressure in the tower, simply by opening or closing the pressure regulating valve, the relation between free and combined changes immediately while the total remains the same. Where an increase in free SO_2 in the cooking acid is wanted, an additional amount of sulphur is burned and the SO_2 thus produced is absorbed as free in the pressure tower. As soon as the cooking acid is built up to proper strength, only as much sulphur is burned as to correspond with consumption and the pressure in the tower is lowered to whatever pressure is required to maintain the desired combined.

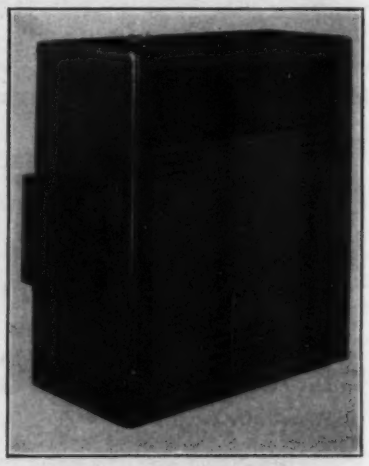
Two advantages for the system, cited by the announcement, are: eliminate need for refrigeration in acid making, and more efficient control of acid composition.



FLOW SHEET FOR PRESSURE ACID SYSTEM

Laboratory Air Conditioner

Carrier Corp., Syracuse, New York, has announced a self-contained air conditioning unit which has been designed specifically for laboratory use. All working parts are enclosed in a single, two-toned walnut grained cabinet (40½ in. high, 40 in. wide, 18 in. deep). Thermal and sound insulation is afforded the interior by fire-resistant rock wool on all sides. The air conditioning apparatus consists of two cooling coils (one in primary air stream, the other in recirculated air stream), a high static pressure centrifugal fan and over-size filters. The refrigeration equipment includes a standard Carrier compressor driven by a ¾ hp. motor. Freon 12 is the refrigerant. An electric boiler type humidifier, heated by two 500-watt percolator heaters, supplies steam for humidification. Two 750-watt strip heaters with both manual and thermostatic control are installed in the discharge air stream for heating. The unit is furnished for 110 volts, 60 cycle, single phase current. Heating, cooling, humidifying, dehumidifying and circulation may be operated separately, or in combination, and automatically or manually. All fan air is passed through a replacement type air filter, consisting of a series of bonded mats of

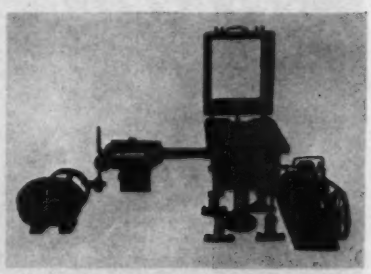


flexible glass fibers enclosed by a fiberboard frame. Under desirable conditions, the unit will serve a room of approximately 1200 cu. ft.

Novel Sheet Machine

A sheet machine with a number of unusual features incorporated in its design has been developed by William C. Nash & Sons, Neenah, Wisconsin. The device designated as the *Nash Automatic Forming Table*, is capable of producing a sheet which will trim 8½ in. x 11 in.

One of the unusual features of the design is an automatic cushion shake. This shake is operated by compressed air, and, through thrust motion, recoils between two sets of springs. The compressed air is supplied by a ¼ hp. compressor. With this



arrangement, shake speed and length of stroke are under absolute control.

The head is exceptionally large to permit study of various dilutions and their effect on formation. It also is fitted with a stainless steel rule for measuring the various heads being used, and with eccentric hinges

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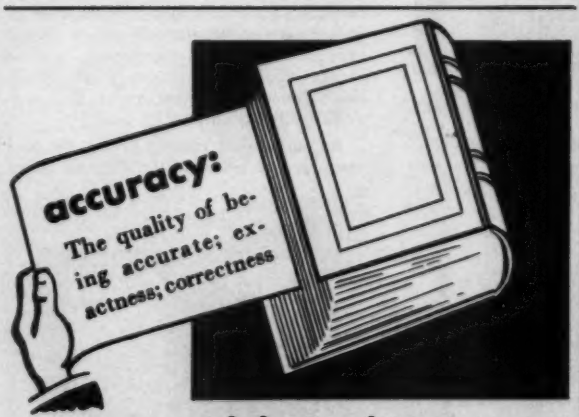

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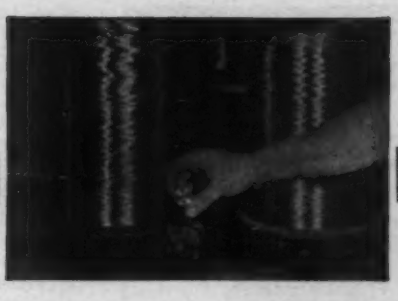

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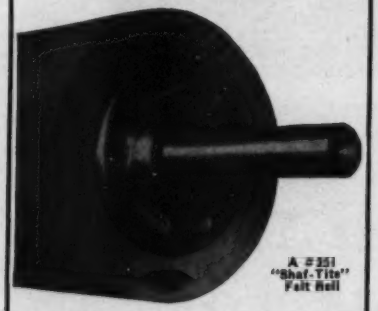

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to minimize any tendency to leakage at the gasket due to wear.

The wire is built up with crossbars underneath a foundation wire. There also is a cushion provision, designed into the head, to assure a drum tight stretch on the wire. Natural drainage on the wire is followed by applied vacuum which is supplied by a ½ hp. blower.

The forming table is suspended on spring brass, and consequently, through the unique controls, formations and weights can be duplicated readily.

Sulphite Pulp Valve

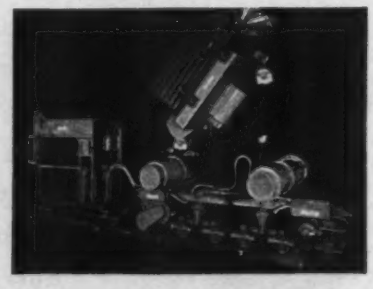
A new valve for sulphite pulp, incorporating a hard-faced coating for resistance to corrosion and erosion, has been announced by Merco Nordstrom Valve Co., 400 Lexington Ave., Pittsburgh. The coating, applied to the plug and interior body surfaces, by a process known as *Merchrome*, gives a surface hardness of approximately 54 on the Rockwell C Scale together with a low coefficient of friction. The corrosion resistance of the Merchrome coating is said to be approximately equal to that of the stainless steels; and a valve, coated by the process, is stated to be capable of operating at temperatures as high as 1000 deg. Fahr.

Water Repellent Emulsion

Protection Products Manufacturing Co., Kalamazoo, Michigan, has announced the development of a water repellent emulsion for water-box, calender stack application to liner board and other papers requiring water repellency. The use of the material is said to leave a finish which does not interfere with printing or with the adhesion of tape.

Tilting Box Grab and Tramrail Carrier

The Cleveland Tramrail Division of The Cleveland Crane & Engineering Company, Wickliffe, Ohio, has developed a tilting box grab and tramrail carrier that picks boxes up, sets them down, or empties them by tilting. The equipment consists of a cab-operated Cleveland Tramrail motor-driven-carrier with two independent hoist-



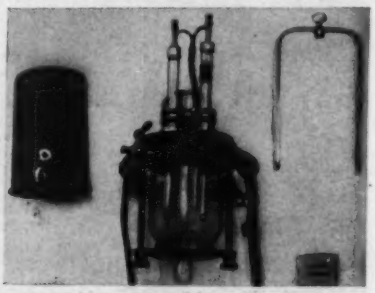
ing units and motorized grab. The boxes used with the grab are provided with four suspension brackets, two on each side. Motor-driven sliding latch bars in the grab may be extended into or retracted from the suspension brackets by the operator in the cab. The suspension brackets make it possible to interlock the boxes, thus facilitating stacking in tiers. Units of any size up to five tons capacity may be furnished.

Process for Removing Silica from Water

W. H. and L. D. Betz, Philadelphia, chemical engineers and consultants on water problems, has announced the development of a patented process for reducing soluble silica in any natural water to a fractional part per million while actually reducing rather than increasing the total solids in the water. Known as the *Absorption Process* for silica removal, the process utilizes Remosil (a specially prepared magnesium oxide) and effects the removal of the silica from the water in hot process softeners. It is stated that the process, especially cited for boiler-feed water treatment in high pressure, high temperature installations, causes no increase in lime and soda ash requirements but rather it effects lower hardness and alkalinity of softened water than would otherwise be possible.

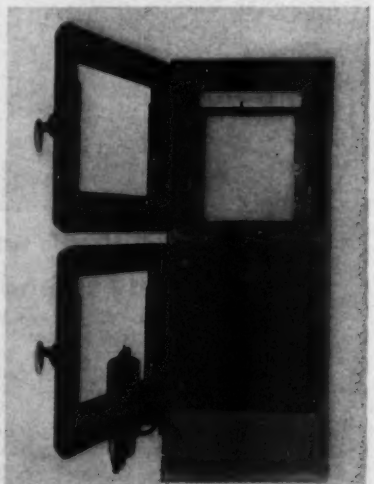
Continuous Recording pH Meter

Cambridge Instrument Company, Inc., Grand Central Terminal, New York, N. Y., has announced a continuous recording *p*H meter. This instrument, known as the *Cambridge Thermionic pH Recorder*, operates on 25 or 60 cycle 110-125 volt lines. In addition to its all-electric operation, the unit

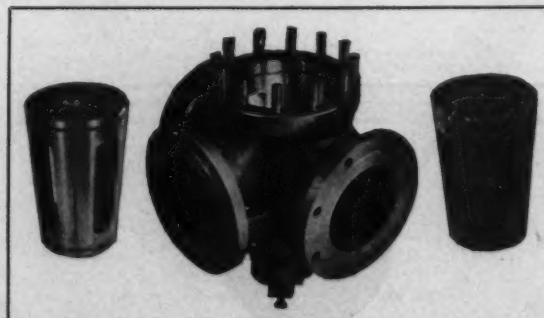


features a glass electrode, automatic standardization with Weston cell, automatic temperature correction, continuous flow of sample, glass sample chamber, remote location of electrode system, vapor- and dust-proof, and flexibility of *p*H range.

An installation consists of the electrode assembly and a combined thermionic poten-



tiometer-recorder. The recorder chart has a width of 10 in., and provides ⅛ in. for each .10 *p*H unit. Standard speed of chart is 1 in. per hr., but other speeds are available. Operating at normal speed, the chart need be replaced only once every two months.



View at left shows Merchromed plug before machining; center view, body; far left, plug after machining.

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The importance of fine quality felts is universally recognized in the manufacture of paper. The quality, speed and long life of the felts have a definite influence on production costs as well as paper quality and finish. We are greatly pleased with the universal acceptance of our felts in the paper industry throughout the country.

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The Waterbury Felt Co.
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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Replacing Iodine in Determining SO_2 and Sulphites

The necessity of saving iodine in Germany has led to new control methods for determining SO_2 and sulphurous acid. The following solutions were used: (1) 0.1*N* Bromine solutions, made up either as bromine—HCl or KBr-Br. In the former, about 3 cc. Br. are dissolved in 500 cc. conc. HCl, and diluted to a liter with H_2O. In the latter, 120 g. KBr are dissolved in a small amount of water, 3 g. Br are added and the solution diluted to 1 liter with H_2O. The Br. solutions are standardized by titrating against 0.1*N* As_2O_3 containing a few drops methyl orange until the red color is completely *destroyed*. This decoloration is a time reaction (10 cc. of 0.05% dye solution requires about 0.3 cc. 0.1*N* Br.). The reaction between Br_2 and the sulphite-ion is analogous to that between iodine and sulphites. As_2O_3 is oxidized to As_2O_5 by Br. (2) *0.1N Chloramine* is made by dissolving about 15 g. crude salt (14.08 g. pure salt) and is standardized by freeing iodine from an acidified KI solution (titrated against 0.1*N* hypo) or by freeing Br. from K Br. solution and titrating against 0.1*N*-As_2O_3. In the latter case titration is carried out to a very pale yellow color after which methyl orange is added drop by drop (repeatedly due to destructive action of the bromine). The persistence of a red color with one drop of 0.1*N* As_2O_3 marks the end-point. A far simpler technique is to add 0.1-0.2 g. methyl orange directly to each liter 0.1*N* As_2O_3, and to titrate to a persistent red end-point. In carrying out direct SO_2 gas analyses, a definite amount (10 or 20 cc.) 0.1*N* chloramine solution diluted with water is used. SO_2 gas is passed slowly into this in the presence of dilute methyl orange solution which enters the standard solution drop by drop. The end point is marked by the non-disappearance of the red, methyl orange color. The total volume (or weight) of the gas consumed is noted. One mol chloramine is equivalent to one mol SO_2. Since Br. oxidizes the indicator more rapidly than does 0.1*N* chloramine, the latter is acidified and treated with 0.150 g. KBr (equivalent to 10 cc. chloramine). The bromine which separates then serves as oxidant, and the direct analysis is carried out as above. In the indirect method for SO_2 determination, a definite volume of gas, *not* the indicator, is titrated. For example, chloramine is acidified and treated with an excess KBr, the bromine then serving as oxidant of SO_2. The excess bromine is back-titrated, using 0.1*N* As_2O_3. Furthermore, in place of chloramine, 0.1*N* bromine—HCl, (or K Br-Br) may be very satisfactorily used both for direct and indirect SO_2 determinations. For analysis of sulphite liquors, tower acid, etc., various analytical methods, similar to the above are suggested. For example, to a definite volume of sulphite liquor, 0.5 cc. 0.1*N* KBr and 1 drop methyl orange are added. Titration with chloramine causes complete oxidation of total sulphites, first of all. Further addition frees bromine which decolorizes the indicator. The slight excess Br. is destroyed by 0.1*N* hypo. Thereupon the addition of methyl red serves in determining free SO_2 (using standard alkali to titrate the H_2SO_4). Another method entails the use of 0.1*N* KBr-Br, titrating the sulphite liquor (containing a small amount of methyl orange). When the bromine is in the slightest excess, the indicator's color is destroyed. This marks the end point of the sulphite oxidation. As usual the free SO_2 is determined by titration of H_2SO_4 with alkali (using methyl red as indicator). Walter Brell. Wochenbl. Papierfabr. *71*, No. 22, 267-9 (1940). The use of chloramine standard solutions used in place of iodine titrations is also briefly discussed by August Noll, who gives 22 literature references. Papierfabr. 38, 15/16 86-7 (1940).

Determination of Free Acid in Aluminum Sulphate and Alum Cake

The author, before devising this method, had to arrive at a standard of "neutrality," convenient strengths for the solution of samples and standard alkali, and a suitable indicator. Potash alum may readily be obtained in the pure state, K_2SO_4 $Al_2(SO_4)_3$ $.24H_2O$. In solution this salt had the same effect as a solution of (an equivalent amount of) Al_2SO_4 and K_2SO_4. Even high grade paper-makers alums gave varying pH values for identical concentrations (1 g. per 100 cc. H_2O, pH 3.40-3.75). However, the pH of equivalent potash alums fell well within this same range, and they agreed exactly with the pH of solutions of chemically pure $Al_2(SO_4)_3$ $.18H_2O$. This indicates that K_2SO_4 has no effect whatsoever on pH values of paper-makers alum, and the various samples of chemically pure potash alums gave solutions with identical pH values. Hence, a potash alum of equivalent $Al_2(SO_4)_3$ content was used as a standard of "neutrality" (i. e., pH 3.5). This solution contained 14.25 g. of pure K_2SO_4 $.Al_2(SO_4)_3$ $.24H_2O$ per liter (of which 100 cc. equals 1 g. $Al_2(SO_4)_3$ $.18$ H_2O). In titrations 0.25 *N* NaOH was used and the best indicator was made by grinding together with a small amount of 50% alcohol, 0.025 g. methyl orange and 0.05 g. Martius Yellow and diluting the mixture to 100 cc. with 50% alcohol. In the procedure a stock solution is made up, so that each 100 cc. contains 1 g. of the commercial papermakers alum to be tested. The solution is filtered if necessary, and 100 cc. of this are placed in a 250 cc. Erlenmeyer with 4-6 drops of the indicator. To another Erlenmeyer are added 100 cc. of standard potash alum solution containing the identical amount of indicator. This is the color standard. The sample in the first flask is then titrated with the standard NaOH to *the same color* as that of the control, in the second flask. Towards the end of the titration, color changes are slow, and 15-30 seconds are allowed after each addition of NaOH. Before the final reading a full 30 seconds should elapse. The number of cc. of 0.25 *N* NaOH consumed equals per cent free acid in the alum calculated as SO_3. The so-called "neutral point" (pH 3.5) was also clearly shown by potentiometric titrations as well as by use of indicator solutions. When to a sample of pure aluminum sulphate, varying quantities of free H_2SO_4 were added, these could be accurately determined (above 0.1%) by three different analysts using the new method, which is very much more accurate than that of Beilstein and Grosset (cf. Sutton's *Volumetric Analysis* [11th Edition] p. 154) J. R. Simmons. Paper-Maker and British Paper Trade J. *99*, (Special Export No.), 14-18. (1940).

Heart Bluestain in White Spruce and Balsam

While most conifers have the bluestain confined to the sapwood, the author obtained bluestained specimens of white spruce and balsam fir from Shelter Bay, Quebec, in which the entire heartwood was bluestained, while the sapwood was free from attack. This fungus was examined, and despite the presence of many hyphal threads, there appeared to be no rotting of the infected wood. The only other case of heartwood bluestain appeared in a Norwegian spruce. There is no evidence that this bluestain materially weakens the structural properties of the wood. However, it is presumably very undesirable in pulpwood because of bleaching difficulties. This type of bluestain then is evidently new to science. Ivan H. Crowell. Pulp and Paper Magazine of Canada, Vol. 41, 451-2 (1940).

Simplified Procedure for Cellulose-cuprammonium Viscosity

The pulp (1 gram) is added to a wide-mouth (106-110 cc.) brown bottle, together with about 20 g. of pure copper (in 1.5 g. pieces), and 100 cc. of cuprammonium hydroxide (13 g. Cu.; 200 g. NH_3; and 1 g. glucose). The copper serves to remove residual oxygen and to break up the pulp on agitation, without affecting the strength of the cuprammonium solution. The pulp solution is transferred to a capillary viscosimeter. The short period of contact with air at this point is apparently not detrimental. Viscosity is determined by the usual method at 20 deg. C. This compares well with the older method, in which nitrogen (not copper) is used to exclude oxygen. The new determination is less costly and can readily be used as a control method by inexperienced analysts. Equipment is illustrated diagrammatically and a full description is given. H. Doering. Papier-Fabr. *38*, 80-2 (1940).

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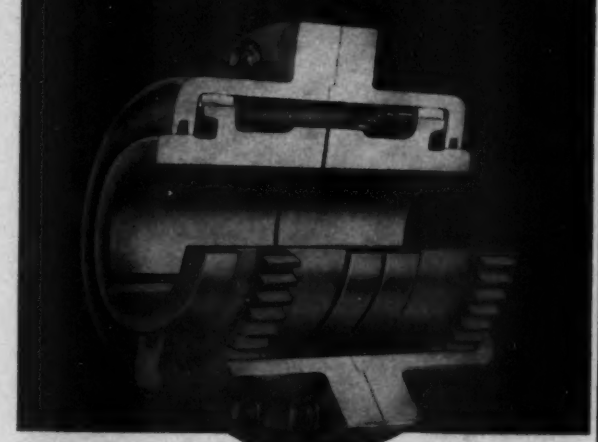

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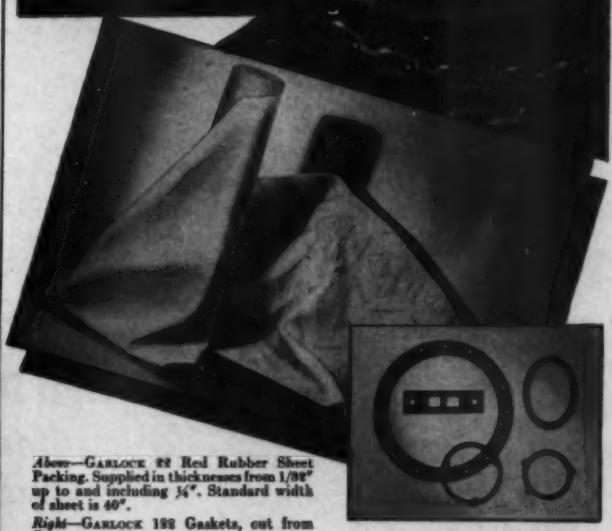

Above—GARLOCK 22 Red Rubber Sheet Packing. Supplied in thicknesses from 1/32" up to and including ¼". Standard width of sheet is 40".

Right—GARLOCK 122 Gaskets, cut from GARLOCK 22 Sheet.

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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Paper Calendering Apparatus

Patent No. 2,190,941. Delbert G. Gardner, East Millinocket, Maine, assignor to Great Northern Paper Company, Millinocket, Maine, a corporation of Maine. Application July 23, 1937, Serial No. 155,284. 2 Claims. (Cl. 92—74). In a paper making machine, the combination of a pair of calender rolls, and means to detach the paper sheet from the surface of the upper roll and to carry the sheet onto the surface of the next lower roll, said means comprising a pipe arranged parallel to the axis of the upper roll having an orifice located in approximately the horizontal plane passing through said axis to apply an air blast directed downwardly in a straight line to impinge against the surface of and approximately tangential to the upper roll counter to the direction of movement of the surface thereof and to impinge against the surface of and approximately radial to the lower roll with sufficient velocity to detach the leading end of the paper from the surface of the upper roll and to carry it by direct action on the paper along the line of the blast across the space between said rolls and to press the paper upon the surface of the lower roll.

Manufacture of Paper

Patent No. 2,184,312. Warner J. Merrill, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. Application July 6, 1936, Serial No. 89,254. 4 Claims. (Cl. 92—21). A process of preparing grease-proof paper which comprises mixing paper pulp before sheet formation with size comprising solution in aqueous medium of deacetylated chitin, precipitating the deacetylated chitin on the paper pulp, forming the pulp into a sheet, drying and then swelling the precipitated deacetylated chitin by surface sizing the paper with size solution in aqueous medium of deacetylated chitin.

Method of Coating Paper

Patent No. 2,185,859. Peter Jay Massey, River Forest, Ill. Application November 14, 1938, Serial No. 240,211. 7 Claims. (Cl. 91—68). The herein described method of producing paper suitable for printing which comprises advancing a wet web of paper, force flowing a controlled excess of a liquid suspension of surfacing material comprising a pigment and an adhesive onto a rotating film forming transfer surface susceptible of being wet thereby and dimensionally pitted for substantially uniform volumetric measurement and for free flowing of the suspension from pit to pit about the periphery of said surface, varying the consistency of the suspension to control the weight of the surfacing finally incorporated in the web, doctoring away the excess of surfacing material, forming a continuous film of predetermined uniform average thickness on said surface by the mutual action of the molecular forces of said suspension and said surface, bringing a surface of the web as it is advanced into contact with a surface of said film after it has been formed, subjecting the portion of the web in contact with the film to rolling contact pressure to cause the film to enmesh with the fibers of the web and be smoothed and compacted and made an integral part thereof as it is applied thereto, and drying the web.

Shredding Device

Patent No. 2,183,224. Sigurd Norman, Portland, Oreg., assignor to Pulp-Paper Machines, Ltd., Portland, Oreg., a joint tenancy composed of said S. Norman, A. C. Littig, and R. L. Hanson. Application December 14, 1937, Serial No. 179,683. 9 Claims. (Cl. 144—176). A shredding device comprising a disc-like member that is mounted for rotation, shredding bits radially mounted on the disc with their cutting edges in spaced position in advance of the face of the disc, means for feeding material to the bits and means for passing shredded material to a point of disposal, the said bits being characterized by being provided with helicoidally receding external surfaces of uniform pitch back of their edges, whereby the feed advance of material to be shredded is uniform from end to end of the bits.

Apparatus for Testing Materials

Patent No. 2,189,589. Everett A. Mahannah and Harold P. Bailey, Niagara Falls, N. Y., assignors to International Paper Company, New York, N. Y., a corporation of New York. Application January 19, 1937, Serial No. 121,252. 10 Claims. (Cl. 73—51). A testing device of the class described comprising in combination, a holder for the material to be tested, an abrasive element rotatably mounted on a support for abrading the surface of the material to be tested, means to reciprocate said support, and means to render said abrasive element inoperative for one-half of each reciprocation of said abrasive element.

Method of Sizing Paper

Patent No. 2,195,600. Arthur Reilly, Westbrook, Maine, assignor to S. D. Warren Company, Boston, Mass., a corporation of Massachusetts. Application October 15, 1936, Serial No. 105,831. 6 Claims. (Cl. 92—21). Method of sizing paper containing alkaline filler which comprises forming a furnish comprising fibrous material, alkaline filler, a rosin size precipitant and a rosin size at least 45% of the rosin content of which is saponified, said rosin size containing a protective colloid of the group consisting of blood albumen, casein, corn protein, gelatine, glue, locust bean gum, oxidized starch and soy bean protein in quantity amounting to at least 4% of the weight of rosin in the rosin size.

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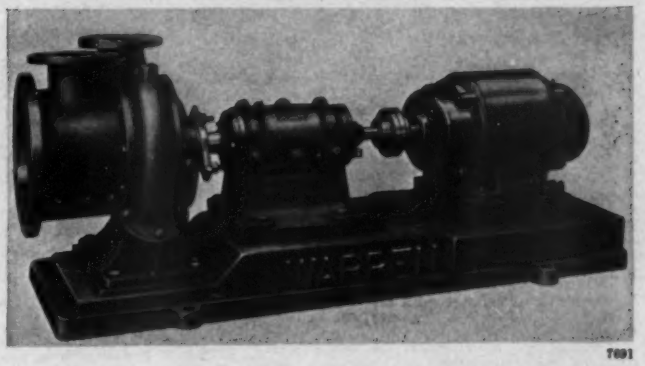

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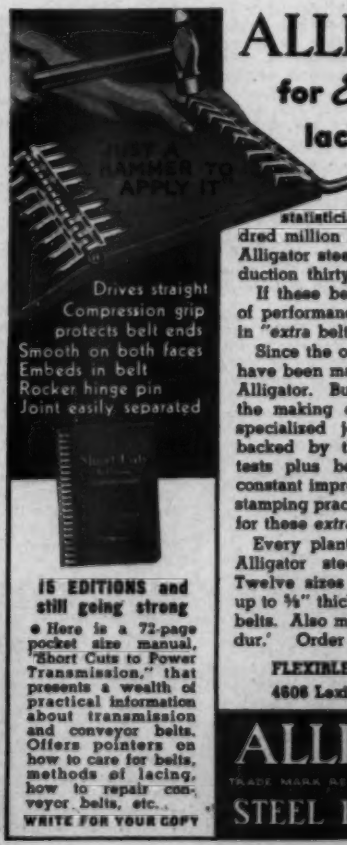

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New Catalogues and Publications

Acme Steel Co., Chicago—A graphic story of this company's skid-load process and how it is used in the moving of materials from the end of the production line to the consumer is contained in the well-illustrated 8-page booklet (Form Ad 18) recently published by this firm. The booklet indicates what manufacturers have accomplished with the use of non-returnable steelstrapped wooden skids and shows how hard-to-handle products often lend themselves to skid shipping. Operations photographs showing the process in use in the paper and other industries are included.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—This company has recently published a bulletin (B-6048) on single-stage, turbo-blowers for use throughout the industry wherever large volumes of air or gas are needed at pressures from one to 6.25 pounds. The loose-leaf release contains numerous photographs and data relative to the equipment. Another bulletin(B-6051-A) recently issued is a revised 16-page edition of the company's Texrope Drive Bulletin. This bulletin is crammed full of facts and data essential in estimating costs, types and sizes of V-belt drive equipment.

American Foundry Equipment Co., Mishawaka, Ind.—Circular No. 52 issued by this firm describes the company's wet disposal unit for dry type dust collectors. Specifications and other data regarding this product are included in the circular.

Cameron Machine Co., Brooklyn, N. Y. —A new broadside illustrating numerous roll winders manufactured by this company has been released lately by the firm. The broadside(Form P.F.-539) contains briefly-written material in caption form in addition to the illustrations.

Cleveland Tramrail, Wickliffe, Ohio.—An interesting bulletin(2004-A) on this company's overhead materials handling equipment has been just put out by this firm. The bulletin shows, pictorially, how the overhead system can be adapted and includes several typical installations. Blueprint layouts of the installations are shown.

Cochrane, Corp., Philadelphia, Pa.—This company's dischargers for high-capacity, high-pressure drainage are described in a new publication(2935) published recently. The publication, using photographs and drawings to good advantage, points out operating features and applications and includes a partial list of typical users.

Crown Zellerbach Corp., San Francisco —A tribute to printing is contained in a booklet of the same name recently published by this company. The publication, a splendid story of the art of printing, contains historical data from the time of Gutenberg to the present with references also to the advent of papermaking. A page decoration in the style of William Caxton is included. The booklet is 12 pages long, has an embossed cover and is printed in deep brown on lighter brown paper.

J. H. Day Co., Cincinnati, Ohio—This company's folder(No. 376) contains material on the firm's Ro-Ball stabilized gyrating screens. Much data and many photographs are included in the release.

De Laval Steam Turbine Co., Trenton, N. J.—An interesting catalogue(L-22-A) entitled "De Laval IMO Oil Pumps," is now available. The catalogue, illustrated throughout, contains written material on the construction, manufacturing methods and features of the line of pumps. The catalogue is 12 pages in length.

Fairbanks, Morse & Co., Chicago—Bulletin 6360, just released by this company, describes and illustrates the company's new line of Figure 6360 mixed flow vertical propeller pumps. In presenting details of the new line the bulletin cites a number of representative installations. Features of the pump are brought out by a huge cross-sectional illustration.

Flexrock Co., Philadelphia, Pa.—A new piece of literature on this company's Ruggedwear, a resurfacing material, has been issued lately. The 4-page folder contains numerous illustrations of the product and instructions as to application; this in addition to several testimonial letters.

B. F. Goodrich Co., Akron, Ohio—This company has just published a new edition of "Cost Finding Record for Conveyor Belts" which is now available on request. The volume contains 12 record sheets of two pages each, sufficient to keep a complete record of 12 conveyor belts for six years with tonnage records for each month on each belt. The sheets provide listings of all essential information on the belt, including make, brand, duck weight, length, width, number of plies, type of joint, time in use, total cost, repairs, etc. Space is also provided for a maintenance record. The use of this booklet, it is believed, will allow every consumer to have a running record of his conveyor belting installation.

J-B-T Instruments, Inc., New Haven, Conn.—A new portable potentiometer pyrometer manufactured by this company is the subject of a bulletin recently issued by this firm. The 6-page release contains considerable data relative to the construction and uses of this instrument including typical installations, operating data and adaptations. Prices are included.

D. O. James Mfg. Co., Chicago, Ill.—This company has published a de luxe catalogue on its motorized speed reducers. The catalogue, a compilation of the firm's catalogues Nos. 17, 17A and 18, contains a wealth of reference and operating data covering helical gear type reducers with ratios 1.2 to 9:1, from ¾ to 50 hp.; planetary type with ratios 10 to 1200:1, from ¾ hp. to 75 hp., and worm gear type with ratios 5 2/3 to 70:1, from ⅛ to 30 hp. Starting with a brief history of the company, this plastic-bound book presents selection tables of the various types of motorized reducers, installation photographs, price lists and explanatory sketches of the integral parts of the product. This 40-page publication belongs in every paper mill library.

E. D. Jones & Sons Co., Pittsfield, Mass. —A new edition of the Jones-Bertram Patent Beater Booklet, 64 pages in length, has been issued by this company. Entitled "A Study of the Beater," the publication contains much interesting data regarding beater operation, comparative results of various types of beaters, different methods of furnishing beaters, formulas, charts, tables, etc. Much valuable information by the author, Samuel Milne, together with supplementary notes by Dwight E. Jones, acting chief engineer of E. D. Jones & Sons Company, is included.

Permutit Co., New York City—Bulletin 2345, just put out by this company, describes Permutit's new oscillating type dry chemical feeder. The illustrated bulletin describes the operating principle and, through a series of drawings and photographs, points out the various features. Dimensions and capacity data are given.

Worthington Pump and Machinery Corp., Harrison, N. J.—Two new bulletins have been released lately by this firm. Bulletin S-500-B38 has to do with the company's Diesel engines (four-cycle direct injection) and contains diagrams, illustrations and clearly-written material about this unit. Dimensional data are given. The other bulletin (S-500-B39) illustrates and describes the company's convertible engines (gas-Diesel).

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.—A new 4-page illustrated folder describing and listing the complete standard line of fluorescent lamp controls, ballasts and capacities for both single and multiple lamp luminaires has been issued by this company. The function of controls and ballasts in the operation of the lamps is detailed and a follow-through of their operation is given. The folder (F.8505) may be obtained from Department 7-n-20.

Wheelco Instruments Co., Chicago—This company's new bulletin (82-2) illustrates and describes the complete line of thermocouples, thermocouple wires, insulators, protecting tubes, etc., manufactured by the firm. The bulletin contians much data including dimensional tables, drawings and photographs.

Yarnell-Waring Co., Philadelphia — Bulletin t-1735 recently issued by this company has to do with the Yarway impulse steam trap. This attractive bulletin, 14 pages in length, contains much valuable reading matter and many illustrations regarding the construction, installation and operating parts of the traps. Considerable amount of data is given.

BOOKS

The Paper Makers' Directory of All Nations (1940)—The 49th edition of this well-known directory has been issued. In appearance and in contents, it resembles previous editions. There is an alphabetical listing of pulp, paper and board mills by countries, which with the exception of England, Wales and Scotland, which appear first, also are alphabetically arranged. Then, too, there is information on British paper trade customs as well as listings covering British and foreign paper trade associations; bag makers, agents (paper, pulp and board), box manufacturers, paper stock dealers, and wholesale stationers and principal paper merchants in England, Ireland, and Scotland; enamellers, varnishers, and surfacers of papers, etc. (British); export merchant shippers of paper (British); stainers of paper (British); and principal British China clay producers and merchants. It is a reference volume of approximately 900 pages. is bound in red cloth cover, and is priced at 25/-net. The publisher is Dean & Son, Limited, 41-43, Ludgate Hill, E. C. 4, London, England.

Lessons in Arc Welding—This book contains a series of 51 lessons which cover fundamental facts upon welding. The lessons, based upon experiences of Arthur Madson, instructor of the Lincoln Arc Welding School, include 19 lessons on the use of unshielded arc electrodes, 9 on shielded arc electrodes, 15 on the use of electrodes for particular joints and metals, and 8 on hard facing. Text explanations are graphically supplemented by line drawings and photos. There also is a series of questions and answers on each of the lessons. Bound attractively in semi-flexible simulated leather, gold embossed, the book is priced at 50 cents a copy, postage prepaid anywhere in the United States, elsewhere 75 cents. The publisher is The Lincoln Electric Co., Cleveland, Ohio.

Fire! Its Cause, Prevention and Control—This publication is a paper-covered booklet which treats of the cause and prevention if fire, classifies fires, discusses the use of various extinguishing agents, and makes some suggestions as to fireproof construction. It is priced at 25 cents a copy by the author and publisher, Harold Joe Davis, Safety Engineer, 3927 East Admiral Place, Tulsa, Oklahoma.

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AFFILIATED COMPANIES

Layne-Arkansas Co., Stuttgart, Ark.
Layne-Atlantic Co., Norfolk, Va.
Layne-Central Co., Memphis, Tenn.
Layne-Northern Co., Mishawaka, Ind.
Layne-Louisiana Co. Lake Charles, La.
Layne-New York Co., New York City, and Pittsburgh, Pa.
Layne-Northwest Co. Milwaukee, Wis.
Layne-Ohio Co., Columbus, Ohio
Layne-Texas Co., Houston and Dallas, Texas.
Layne-Western Co., Kansas City, Mo. Chicago, Ill., Omaha, Nebraska
Layne-Western Co. of Minnesota Minneapolis, Minn.
Layne-Bowler New England Company, Boston, Massachusetts.
International Water Supply, Ltd., London, Ontario, Canada

LAYNE

PUMPS & WELL WATER SYSTEMS
For Municipalities, Industries, Railroads, Mines and Irrigation

KALAMAZOO ★

Glazed Tile TANKS

As permanent as reinforced concrete—and cost less. First tanks built show no deterioration today and are as clean as when first erected.

Manufacturers of wood tanks for 60 years.

GLAZED TILE — KALAMAZOO TANK & SILO CO. — WOOD
KALAMAZOO MICHIGAN

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS

	per cwt.
Blue Overalls	4.25 to 4.50
Corduroy	2.25 to 2.50
Cottons—	
Washables, No. 1	1.85 to 2.00
Fancy Percales	3.75 to 4.00
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.70 to 1.85
New Dark Seconds	1.50 to 1.65
Khaki Cuttings—	
Mixed	2.50 to 2.75
O. D.	3.00 to 3.25
New White Canvas	7.50 to 8.00
New Mixed Blacks	2.25 to 2.50
Shirt Cuttings—	
New White No. 1	6.75 to 7.00
Silesias No. 1	4.25 to 4.50
New Unbleached	6.50 to 6.75
Fancy	2.00 to 2.25

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	.90 to .95
No. 2	.80 to .85
No. 3	.70 to .75
Twos and Blues—	
Repacked	1.60 to 1.75
Thirds and Blues—	
Repacked	1.40 to 1.50
Miscellaneous	1.10 to 1.20
White, No. 1—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75
White, No. 2—	
Repacked	2.50 to 2.75
Miscellaneous	2.00 to 2.25

RAGS (Foreign)
ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Guany No. 1—	
Foreign	2.30 to 2.40
Domestic	2.30 to 2.40
Wool Tares—	
Light	2.25 to 2.35
Heavy	2.40 to 2.50
No. 1 Scrap Bagging	2.00 to 2.15
Manila Rope—	
Foreign	4.75 to 5.00
Domestic	4.75 to 5.00
New Burlap Cuttings	3.25 to 3.50
Jute Threads—	
Foreign	3.25 to 3.50
Domestic	2.75 to 3.00
Strings—	
Sisal	2.25 to 2.50
Soft jute	3.00 to 3.25
Mixed	1.10 to 1.25

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	3.00 to 3.25
Ord. Hard White No. 1	2.25 to 2.50
Ord. Soft White No. 1	2.10 to 2.25
Soft White, Extra	2.50 to 2.75
Flat Stock—	
Stitchless	1.00 to 1.10
Overissue Mags	.80 to .90
Solid Flat Book	.70 to .80
Crumpled No. 1	.55 to .65
Solid Ledger Books	2.00 to 2.10
Ledger Stock—	
White	1.75 to 1.90
Colored	1.35 to 1.50
New B. B. Chips	.25 to .30
Manilas—	
New Env. Cuts	2.50 to 2.65
New Cuttings	1.85 to 2.00
Sulphite Mill Wrappers	.25 to .30
No. 1 Old Kraft	1.35 to 1.50
News—	
No. 1 Wh. News Cuttings	1.35 to 1.50
Strictly Overissue	.45 to .50
Strictly Folded	.35 to .40
No. 1 Mixed Paper	.22½ to .25

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.75 -
Ground, cwt.	3.50 -
Powdered, cwt.	3.90 -
Blanc Fixe—	
Pulp, bulk, ton	35.00 to 40.00
Dry, barrels, pound	.0300 to .0400
Bleaching Powder—	
Drums, cwt.	2.00 to 3.00
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	13.00 to 14.00
80-100 mesh (bags), lb.	13.50 to 14.50
Argentine, lb.	11.50 to 12.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	11.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	13.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	1.75 to 1.90
Gelatine (silicin), lb.	.52 to .55
Glye. (C.P.) drums, lb.	.1250 to .1300
Litharge, powd., bbl., lb.	.0775 to .0800
Rosin (Gum)—	
New York, per 100 lbs.	
E	2.15–
F	2.37–
G	2.44–
WW	3.00–
Rosin (Wood), carlots	1.44–
Salt Cake—	
Dom. bulk (wks) ton	16.00 to 17.00
Imp. bulk on dock—	
(Atl. ports) ton (Nom.)	30.00 to
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—Ammonia,	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.75 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.80 -
Pearl, barrels, cwt.	2.90 -
Paper (Sp.) bags, cwt.	2.90 -
barrels, cwt.	3.00 -
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	14.00 to 17.25
Imp. bulk, ton (Nom.)	23.00 to -
Titanium Dioxide—	
Barium Pig., bbls., lb.	.03¼ to .05½
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	.07½ to .07¾

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached, contract	3.30 -
Open market	3.35 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	4.00 to 4.25
Kraft No. 1	3.25 to 3.50
Kraft, Southern, del.	3.25 to 3.50
Sulphate (Imp.) on dock—	
Bleached	4.50 to 4.75
Kraft No. 1	3.50 to 3.75
Kraft No. 2	3.25 to 3.50
Sulphite (For.)	
On dock—	
Prime bleached	4.00 to 4.25
Prime easy bleach	3.75 to 4.00
Prime strong unbl.	3.50 to 3.75
Sulphite (Dom.)	
Bleached, contract	3.62½ -
Bleached, open market	3.75 -
Unbleached, contract	3.17½ to 3.37½
Unbleached, open market	3.25 -

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. pulp mill)	34.00 to 37.00
No. 1 Imp. (On dock)—	
Moist	(nominal) 43.00 to 48.00
Dry	(nominal) 45.00 to 50.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	73.00 to 80.00
Chip	32.50 to 35.00
Chip, sgl. mls. lined	50.00 to 55.00
Coated, white patent .016	77.50 -
.020 and heavier	72.50 -
Kraft liner	55.00 -
News	32.50 to 35.00

	per cwt.
Book (eased)	
No. 1 Glossy Coat	11.50 to 13.50
No. 2 Glossy Coat	10.35 to 11.75
No. 3 Glossy Coat	9.55 to 11.00
No. 4 Glossy Coat	9.15 to 10.50
No. 2 Offset	7.70 to 9.00
A Grade M. F.	6.75 to 7.25
A Grade Super	7.00 to 7.50
B Grade M. F.	6.30 to 6.80
B Grade Super	6.55 to 7.05
B S. & S. C. Litho	6.80 to 7.30
B M. F. Litho	6.55 to 7.05
Ivory & India	.50 cwt. extra
Bonds (Rag Content)—	
100% Rag	
Ext. No. 1	39.10 to 46.00
100% Rag	31.05 to 38.50
85% Rag	
75% Rag	23.80 to 27.75
65% Rag	20.50 to 25.00
50% Rag	17.55 to 21.50
25% Rag	14.65 to 17.75
Regular Colors	1.00 cwt. extra
Bonds (Sulphite)—	
No. 1	8.95 to 11.00
No. 2	8.05 to 9.75
No. 3	7.60 to 9.25
No. 4	7.30 to 9.00
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	13.75 to 14.00
Bleached (25 lb. up)	12.75 to 12.87½
Unbleach. (25 lb. up)	11.00 to 11.25
Greaseproof—	
Bleach. (25 lb. up)	10.50 to 10.75
Unbleach. (25 lb. up)	9.50 to 9.75
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	16.80 to 19.25
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	10.10 to 12.25
No. 2	9.25 to 11.25
No. 3	8.50 to 10.75
No. 4	8.50 to 10.25

	per ton
News—	
Rolls (Contract)	49.00 to 50.00
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	.97½ -
White, No. 2	.70 to .77½
Anti-Tarnish M. G.	.80 to 1.05
Colored	.87½ to 1.10
Kraft	.80 to .90
Manila	.70 to .77½
Napkins, semi-crepe (12¾ lb. to M shts.) per cs.	.41 -
Napkins, full crepe and emb'sed (12¾ lb. to M shts.) per cs.	.43¾ -
Toilet, Bleached (M shts.) per cs.	5.80 -
Toilet, Unbleached (M shts.) per cs.	3.50 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.95 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	5.25 to 5.75
Super-Standard	4.87½ to 5.25
Northern Standard	4.25 to 4.75
Southern Standard	4.25 to 4.75
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	6.40 to 6.50
(10,000 lbs.)	6.60 to 6.90
Drug wrapp. 35 lb.	6.25 to 6.50
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.50 to 4.75
No. 1 Butchers	5.00 to 5.12½
No. 1 Imit. Parch & Dry Fin. Groe. Sulphite 30 lb.	5.50 to 5.75
No. 2 Imit. Parch & Dry Fin. Groe. Sulphite 30 lb.	5.25 to 5.50
Steam Finish, 50 lb.	4.00 to 4.25
Water Finish, 40 lb.	4.50 to 4.75
Manilas—	
Envp. Mls., Sub. 16-40 (No. 1)	5.25 -
Envp. Mls., Sub. 16-28 (No. 2)	5.00 -
Envp. Mls. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mls. 35 lb. up—	
No. 1	5.25 -
No. 2	5.00 -
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	6.00 -
Grade B-25 lb.	5.50 -